University of Alberta

Qualitative Analysis of the Canadian Graduate Orthodontic Student Selection Process

by

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ABSTRACT

There is minimal published literature on selection procedures/criteria used for graduate orthodontic admissions in Canada/U.S., leaving students confused and relying on rumor. A lack of consensus results in a variety of selection procedures, subjectivity and reliance on intuition. Objectives of this study were to describe processes used by programs to select master's students and identify qualities of "ideal" candidates. Grounded theory was used to analyze recorded telephone interviews with 14 Canadian orthodontic program directors/faculty/students. The following chronology of events was noted: pre-application, application, reference-evaluation, social-evening, tests, clinic-visit, interviews, post-interview discussion and ranking, final selection and candidate-feedback. The "ideal candidate" was one who had excellent intellectual abilities, a particular set of skills/personality traits, and additional positive attributes. These findings may provide a resource for future applicants as well as an opportunity for programs to analyze their own selection procedures. The study may also act as a catalyst for positive change.

Table of Contents

Chapter		Page
1.	Introduction and literature review	1
	1.1 Introduction	1
	1.2 Specific Goals of the Study	2
	1.3 Literature Review	2
	1.4 Summary	14
	1.5 Bibliography	16
2.	Paper #1 (Qualitative Analysis of Selection Criteria for Canadian Graduate Orthodontic Students)	20
	2.1 Background	20
	2.2 Methods	21
	2.3 Findings	23
	2.3.1 The Ideal Applicant	23
	2.3.2 The Selection Trajectory	24
	2.3.3 Basic Social Process	24
	2.4 Discussion	26
	2.5 Implications	29
	2.6 Conclusion	30
	2.7 Tables	
	2.7.1 Table 2.1	31
	2.7.2 Table 2.2	31
	2.7.3 Table 2.3	32
	2.8 Bibliography	33
3.	General Discussion and conclusions	36
	3.1 Introduction	36
	3.2 Methods	36
	3.3 The Ideal Applicant	39
	3.4 The Selection Trajectory	49
	3.5 Basic Social Process	56
	3.6 International Applicants	65
	3.7 Objectivity	65
	3.8 Standardization	65
	3.9 Integration with the literature	66
	3.10 Implications	76
	3.10.1 Programs	76
	3.10.2 Students	77
	3.10.3 Research	78
	3.11 Bibliography	79

List of Tables

Table		
2.1	Sample Characteristics	31
2.2	Selection Trajectory	31
2.3	Stages in performing due diligence	32
3.1	Stages in performing due diligence	57

Chapter 1- INTRODUCTION AND LITERATURE REVIEW

1.1 INTRODUCTION

Becoming an orthodontist is a dream for many dentists and dental students. This is not surprising when one considers what the specialty has to offer. A survey by Roth (2003) concluded that most Canadian orthodontists (79.3%) were satisfied with their profession. The same study, comparing previous research on dentists, found that if they could do things over again, 87% of orthodontists would choose the same profession, compared to only 49% - 65% of dentists. There are also significant financial rewards associated with the private practice of orthodontics. The 2003 JCO Orthodontic Practice Study by Keim found the median net income for practicing orthodontists in the U.S. was $350,000. Dentists who own their practices earned about half that amount i.e. $177,340, in the same year (American Dental Association web site).

With a limited number of accredited graduate orthodontic training programs in North America there is an oversupply of outstanding candidates competing for few positions. In 2003, there were 180 applicants for just seven places at the University of Pennsylvania (AAO Bulletin March 2004). The University of Alberta program received over 70 applicants for four positions in 2005 (personal communication). This competition results in a stressful situation for applicants and selection committees. There is no published literature on selection procedures and criteria used for graduate orthodontic admissions, leaving students confused and relying on rumor and anecdotal information. A lack of consensus among program directors results in the use of a variety of selection processes, subjectivity and reliance on intuition. The proposed study aims to identify the process that underlies recruitment in Canadian graduate orthodontic programs.

1.2 SPECIFIC GOALS OF THE STUDY

Primary Objectives

- Describe procedures used by orthodontic graduate programs to select master's students.
- Identify the desirable qualities of the "ideal candidate" as identified by graduate program directors / full-time faculty / current students.
- Describe the process that underlies student recruitment.

Secondary Objectives

- Identify key differences in the selection of international versus U.S./Canadian students.
- Determine the interest (perceived need) for a standardized selection process and objective criteria for the ideal candidate.

1.3 LITERATURE REVIEW

There is limited literature pertaining to the selection of students for graduate orthodontic programs. Most studies reviewed were conducted in the U.S.

SELECTION OF STUDENTS FOR GRADUATE DENTAL PROGRAMS

Graduate dental programs have traditionally put a great deal of emphasis on academic performance. Spina et al. (2000) found that past academic performance heavily influences the initial stages of oral and maxillofacial surgery resident selection i.e. application review and interview invitation (n=71 programs). Academic achievement is usually judged by a review of dental school class rank (considered very important by 76.1%), dental school basic science grades (70.4%), dental national board scores (69%), and dental school clinical grades (63.4%). Private practice experience was given little importance by 71.4% of respondents. Letters of recommendation were considered more

valuable when written by a department chairman and program director. The highest rated characteristics observed during the interview included being energetic, confident, and honest. In 88.7% of programs a committee completed the decision process, whereas in the remaining 11.3% of programs it was completed by the program director or chairman. House staff participated in the decision process in 94.4% of the programs. Most programs (89.9%) indicated satisfaction with their current selection process.

Other authors have questioned the relative contribution of past academic performance as a predictor of success in graduate dental programs. Harris et al. (1976) in a sample of 78 students found that performance in the Michigan graduate orthodontic program correlated poorly with undergraduate class standing. His finding of a correlation coefficient, $r = 0.40$ (p value not mentioned) indicated that only $R^2 = 16\%$ of the total variability in the distribution of the final graduate class standing was explained by undergraduate class standing. Undergraduate orthodontics courses made no significant contribution to this prediction. Michigan graduates who had practiced for at least a year prior to returning for graduate study performed better than those who had immediately entered that program right out of dental school. Harris suggested therefore that factors other than undergraduate class rank should receive considerably more weight in the selection process.

Handelman et al. (1983) evaluated common predictors for selecting 154 postdoctoral dental students in the Eastman Dental Center advanced general dentistry training program. He found that of all proposed predictors of performance, the highest correlation was with academic achievement ($r = 0.347$, $p \leq 0.05$). This correlation was similar to the r value found by Harris who was of the opinion that 0.40 (p value not mentioned) was a poor correlation. Weaker, though statistically significant, correlations were found for the personal interview ($r = 0.206$, $p \leq 0.05$) and letters of recommendation ($r = 0.192$, $p \leq 0.05$). He concluded there was no single predictor that one could use with confidence and ended his article stating "we have become far more humble in estimating our abilities as judges."

Rinchuse and Rinchuse (2004), clinical professors of orthodontics at the University of Pittsburgh, noted that,

> *"...orthodontic graduate programs have avoided discussing their admissions policies for far too long. It is time to give this matter the serious attention it deserves. Our profession, society, and our patients demand that those who are admitted to our orthodontic programs become the very best orthodontists, able to provide quality technical treatment and deliver it in a compassionate manner."* (page 747)

They state that admissions to graduate orthodontic programs are restricted to those with the highest dental class ranks/grades and national board scores. "Fact retention" is more important to the process than affective (attitudes, interests, values, and appreciations) and psychomotor areas. They observed that students with high ranks in dental school frequently lacked creativity and adaptability and did not have the writing or research skills required for success in graduate orthodontic programs. They noted that the qualities essential in an orthodontist are a reasonable intellect, a certain level of knowledge, critical thinking, motor skills, leadership, motivational abilities, and compassion and concluded that these qualities should form the foundation of the orthodontic selection process.

The only literature on applicants' opinions about the selection process for graduate dental programs is in oral and maxillofacial surgery. Marciani et al. (2003) concluded that applicants preferred programs that they perceived to have a good reputation and abundant clinical material. Residencies that convey a friendly atmosphere, that had residents who possessed favorable interpersonal skills, and that had faculty with appealing personalities were the most attractive to candidates.

SELECTION OF STUDENTS FOR OTHER HEALTH RELATED GRADUATE PROGRAMS

Although there is more literature on the selection of students for other health-related graduate programs, similar results are apparent. Several authors reported that

grades were among the most important factors in the selection process.

Grantham (1993) obtained a 69% response rate to his questionnaire mailed to 195 radiology program directors. He found that the majority of criteria for selection of residents had significant regional and/or program type variation. Class rank and medical school grades were found to be most important. Barely half of the programs surveyed considered letters of recommendation to be an important selection criterion. Grantham concludes that "selection of radiology residents is a nonscientific and imperfect process used by scientists striving to make it perfect".

DeLisa (1994) surveyed physical medicine & rehabilitation (PM&R) program directors and obtained a response rate of 88%. He found that the most important criteria used by directors to rank candidates were the interview, letters of recommendation, and medical school transcripts. The least important was research interest. The most important academic criteria in selecting residents were grades in PM&R clerkship in their facility, followed by those in another facility. Rank order in class was listed fourth in importance. Research ability, and pre-existing research qualifications (PhD, Masters degree) were lowest in importance. The most important letters of recommendation were from a clinical PM&R faculty member in the respondent's department, followed by the chairperson of a PM&R department, and the Deans letter. During the interview the three most important characteristics considered were compatibility with the program, ability to articulate thoughts, and ability to work with the team.

Crane (2000) surveyed 118 emergency medicine (EM) program directors, obtaining a 79.7% response rate. The most important (4.0-5.0) selection criteria reported on a scale of 1 to 5 were EM rotation grade (4.79 ± 0.50), interview (4.62 ± 0.63), clinical grades (4.36 ± 0.70), and recommendations (4.11 ± 0.85). The first three items were the most agreed upon by respondents, having the lowest standard deviation. The least emphasis was placed on publications (2.87 ± 0.99) and personal statements (2.75 ± 0.96). Programs reported having minimum requirements for the USMLE scores.

Bernstein et al.'s (2002-2003) survey of orthopedic residency selection criteria found the most important criteria for program directors (n=109) were: the candidate performed a rotation at the director's institution (ranked an average of 7.88 in importance on a scale of 1 to 10), USMLE Part I score (7.78), rank in medical school (7.77), formality/politeness at interview (7.55), and personal appearance of candidate (7.35).

Other investigators reported that other factors were most important in the selection process. Baker (1993) analyzed CARCS (computer assisted resident candidate selection) files and found that quality of references were the most important component in the pre-interview performance during selection of residents (all applicants had high grades). The interview was found to be the other important factor determining selection outcome.

Poirier (2003) obtained a response rate of 93% from 43 Pediatric emergency medicine (PEM) program directors that were mailed questionnaires. Selection factors for the subspecialty were graded based on a five point Likert scale. The goal of the first stage of the selection process was to short list candidates for interview. The most important factors considered were recommendation letters from PEM colleagues, research potential, and applicant's pediatric program reputation. Letters from PEM division chiefs and clinical faculty were most important. The least important factors were undergraduate institution reputation, grades in medical school, and board scores. Final ranking was based on the following factors listed in descending order of importance: ability to work in a team, compatibility with the program, commitment to hard work, ability to grow in knowledge, solve problems, listen and articulate thoughts.

Selection committees find it challenging to evaluate overseas credentials. Gayed (1991) surveyed internal medicine residencies to assess criteria used to select foreign born medical graduates that predicted performance. Performance in the interview and post graduate clinical experience in the U.S. were amongst the most important predictors. 73% of directors relied on reference letters from the U.S. believing that those from

foreign countries were useless. Sixty percent of directors stated that foreign medical school transcripts and class ranks were useless.

CORRELATION OF SELECTION FACTORS WITH PERFORMANCE IN STUDENTS FOR OTHER HEALTH RELATED GRADUATE PROGRAMS

In the studies that were reviewed a variety or selection factors were correlated with different methods of student (or resident) performance appraisal. Some authors have found that academic performance predicted success in health-related graduate programs. Calhoun (1997) obtained responses from otolaryngology directors to a 12-item questionnaire on the academic, technical, interpersonal and global skills of each of one hundred residents. She found that highly satisfactory residency performance could be reasonably predicted by excellent academic performance in medical school.

Andriole (2004) mailed questionnaires to program directors of 87 surgical graduates to determine postgraduate year 1 (PGY-1) performance. A mean composite PGY-1 score was based on scores obtained on a 5-point ordinal scale which included the following items: factual knowledge, data collection, interpretation and analysis, use of literature, interpersonal skills with patients and professionals, ethics, character/integrity, leadership, clinical judgment, industriousness, suitability for a career in clinical practice, overall impression and preparedness. Significant associations were found between PGY-1 evaluation score and each of third year clinical clerkship grade point average and United States Medical Licensing Examination (USMLE) step 2 score. In a multiple linear model the latter was the only significant of PGY-1 performance

However, other authors have not found a correlation between academic success and residency performance, other than in cognitive function tests. Borowitz (2000) had ten faculty members rate the clinical performance of 69 pediatric house officers using a 5-point scale based on knowledge, technical skills, maturity, and individual judgment. He found that medical school grades, performance on standardized examinations, interviews, and match-list ranking were not predictors of clinical performance during residency. While individuals ranked in the top 10 of the match list performed better than their peers,

for all other residents there was no association between match ranking and subsequent performance. He postulates that some students who excel during medical school do not perform well in residency because the skills and attributes required for excellence differ.

Boyse (2001) reviewed records of 77 radiology residents. Medical school performance was correlated with subsequent radiology residency performance. The latter was based on an assessment of rotation evaluation forms, performance evaluation by three faculty members, and scores obtained on the American College of Radiology and American Board of Radiology examinations. The rotation evaluation forms contained assessments on general knowledge and overall performance at the conclusion of each 3-4 week subspecialty rotation. Performance evaluations were based on a 4-point scale assessing general knowledge, overall performance and interpersonal skills. It was found that medical school performance in preclinical courses, some clinical courses and the USMLE predicted success on the American Board of Radiology examination, but not rotation performance. Outstanding dean's letters and letters of recommendation, selection to Alpha Omega Alpha, and medical school prestige did not predict high examination scores or residency performance. In fact none of the elements from medical students applications predicted performance during the residency.

Bell (2002) found a positive correlation between the USMLE scores for 24 residents and their subsequent performance on in-training examinations. Thus standardized cognitive function tests taken by medical students may be predictive of similar tests during residency. However when 20 residents were evaluated by faculty on their cognitive and non-cognitive clinical abilities (based on a 5-point questionnaire with 26 questions on clinical judgment and acumen, patient rapport, surgical skills and work ethic) no correlation was found with medical school achievements i.e. USMLE scores, clinical rotation honors grades, and interview scores. Thus they conclude an inability to accurately predict total performance of residents from medical school achievement. They stress that the "best" students do not always make the "best" residents and advise that each specialty investigate the relationship between performance in medical school and in residency.

Dirschl et al. (2002) correlated selection criteria with subsequent performance of 58 orthopedic residents. Performance measures were based on the Orthopedic In-Training Examination, American Board of Orthopedic Surgery Part I Examination, and a 5-point rating by 6 faculty members on overall performance, cognitive skill, affective performance, and psychomotor skill. He found the number of honors grades on clinical rotations to be the strongest predictor of performance ($p < 0.05$). None of the other predictors were significant e.g. election to Alpha Omega Alpha ($p < 0.15$). Letters of recommendation had a poor correlation with all of the outcome variables ($p > 0.5$). Orthopedic in-training examination or American Board of Orthopedic Surgery Examination scores also did not have a significant correlation with any of the predictors.

Carmichael (2005) found among 60 residents in orthopedics that those with scores above 220 in the USMLE fared better in the Orthopedic In-Training Examination. Married residents also achieved higher scores.

Hayden (2005) conducted a retrospective global assessment by 13 faculty members on 54 graduating emergency medicine residents comparing information submitted at the time of application with overall performance in the program. Out come measures were based on a 5-point ordinal scale among the following categories: patient care, systems-based practice, medical knowledge, professionalism, inter-personal skills and academic performance (research productivity, teaching and presentation skills, scientific writing ability, and involvement in Emergency Medicine organizations). He found that the previous medical school attended was the strongest predictor of success, presumably since top schools may have attracted the best candidates in the first place. Other predictors included distinctive factors (championship athlete, officer in medical school), USMLE percentile, and ratings on the dean's letter/other recommendation letters.

Studies have shown poor correlation between selection factors and future residency performance. Smith (1991) compared the performance of students in medical school and residency (based on residency program directors ratings of overall

performance on a 5-point Likert-type scale) admitted with and without an admission interview. He found that the performance of the two groups were not significantly different, calling into question the validity and reliability of selection interviews.

Adusumilli (2000) correlated 54 senior radiology residents performance using subjective and objective measures, with selection rank order ($P<.05$). Subjective assessment of performance was carried out by calculating mean scores in 4th-year of residency in general knowledge and overall performance using a corrected z-scale which combined data from two previously used and different evaluation forms. A retrospective evaluation by four senior faculty members on overall resident performance using a 5-point scale was also used. Objective assessment of performance was based on scores obtained in the American Board of Radiology written examination. The author found no correlation between applicant rank and subsequent performance.

Metro (2005) correlated scores that anesthesiology applicants receive after interview with subsequent evaluation during training at the University of Pittsburgh. There is an extensive selection process. Interview short listing depends on USMLE scores, dean's letter, personal statement, and recommendation letters. Candidates attend a dinner the night before being subjected to 4-5 faculty interviews. Resident performance was assessed by faculty year end evaluations in knowledge, judgment, motor skills, pre-anesthetic assessment and planning, interpersonal attitudes/attributes and overall impression. In training examination results were also used as an indicator of performance. The author was unable to find a statistically significant correlation between selection committee scores and any area evaluated throughout residency, other than the first year in training examination ($p<.05$). He therefore concluded that it may not be possible to judge an applicant during a one day visit and that the selection process is unable to predict which applicant will excel.

MEDICAL AND NON-MEDICAL LITERATURE DEALING WITH INTERVIEW BIAS

Some authors have presented a case for "blinded" interviews. Macan (1990) obtained participation from one hundred and twenty recruiters who provided data on 235 interviews in a college placement setting. The study explored the relationship of pre-interview impressions of candidates to post-interview impressions and success in recruitment. He found that recruiters' post-interview impressions of the candidates' qualifications were significantly related to their pre-interview impression ($r=.53$, $p<.01$).

Smilen (2001) correlated interview and USMLE (United States Medical Licensing Examination) scores over two years. In the first year interviewers were provided applicants USMLE scores, whereas in year 2 they were not. He found a significant correlation between year 1 interview and board scores (correlation coefficient 0.64), and a negative correlation in year 2 (correlation coefficient -0.06). He concluded that markers of academic achievement e.g. USMLE scores may create a bias and therefore interviewers should be blinded to board scores and possibly other data such as transcript grades to ensure the interview remains an independent means of evaluation.

Miles (2001) studied 132 surgical residents who underwent two separate interviews, one by committee members informed only of the applicant's name and medical school, and a second where interviewers had prior knowledge of the complete application. He found that the assessment of candidates may be significantly influenced by data provided to interviewers prior to the interview. Most participants believed it would be best to offer one blinded and one unblinded interview to obtain a better knowledge of each applicant.

There are advantages to both structured and non-structured interview formats. Patrick (2001) evaluated two residency admission interviews by each of 490 applicants using a structured format. He found moderate to low correlations with other admission

criteria e.g. cumulative GPA and MCAT, suggesting that information obtained at interview was unavailable from other sources. Thus they should be used in addition to other selection measures. Agreement between interviewers' overall score was good suggesting that structured interviews would be a valuable selection tool.

Bandiera (2004) attempted to determine intrarater, interrater, and overall reliabilities of a structured interview format with structured scoring procedure used on 16 emergency medicine applicants who were interviewed by four pairs of interviewers. Overall interview scores had high reliability (0.83). Each interviewers scores had high intraclass correlations (mean 0.85), but within interview teams interrater correlations were moderate and not higher than across interview teams (0.36, 0.59, 0.69, 0.49). He thus concluded that highly reliable overall interview scores could be achieved if scoring instruments were well designed and interview protocol was strictly adhered. Global impressions are used to base interview assessments despite efforts to maximize objective assessment of candidates specific attributes.

Conway (1995) conducted a meta-analysis of 49 coefficient alphas and 111 interrater reliability coefficients from selection interviews. For highly structured interviews he estimated upper limits of validity to be .67, and for unstructured interviews .34. Increasing standardization improved interrater reliability and construct validity.

Blackman (2002) evaluated structured and unstructured interviews on 102 undergraduate students at a 4-year university. She found that unstructured interviews produced significantly more accurate judgments about the candidates job-related personality attributes. Such interviews allowed applicants to talk for significantly greater periods than in structured formats. The author therefore recommends initial screening using a structured interview to gain insight into the applicants job related skills. This may be followed by an unstructured interview on short listed candidates to explore work related personality traits.

Other factors that create bias in interviews have been discussed in the literature. Anderson (1990) had thirty eight graduate interviewers assess 330 interviewees. He found that interview outcomes were substantially linearly dependent on the applicant's facial non-verbal behaviors. Applicants with similar backgrounds, attitudes and perceived personalities were preferred by interviewers. There was a correlation between evaluations of r=0.5 with perceived similarity, and r=.64 with personal liking, showing how susceptible interviewers were to such biases. The author therefore recommends that interviewees maintain frequent eye contact with interviewers display frequent positive facial expressions. A "clone syndrome" was apparent where interviewers were recruiting in their own image.

There is literature on personality and how it affects performance. Digman (1990) wrote at length on the emergence of the five factor personality model. He stresses that the model provides broad dimensions that categorize individual differences in personality and allows measurement with high reliability and validity. Under the "Big Five" dimensions (Extroversion, Conscientiousness, Emotional Stability, Agreeableness, and Openness to Experience), many hundreds of personality traits can be categorized.

Barrick (2001) examined 15 prior meta-analytic studies that studied the relation between the five factor personality model and job performance. In all occupations, conscientiousness predicted job performance, as did emotional stability for overall work performance. Extraversion, openness and agreeableness were found to predict specific occupational success, but not overall work performance.

Silvester (2002) conducted studies to determine how candidates create positive impressions with interviewers. Sixty two applicants filled out a questionnaire prior to interview. It was found that interviewers evaluations of applicants correlated with *internal controllable attributions* ($r=.36$, $p<.001$). In another study involving 103 interviewers, it was found that internal controllable explanations created more positive impressions. However "External" interviewers were more positive about *external uncontrollable explanations* than "Internal" interviewers. *Internal controllable*

attribution would be seen in the following statement: "I didn't get the promotion because I spent too little time on personal development." Such a statement may indicate future levels of motivation in a candidate who takes greater responsibility for his/her actions and presumes more control over ones environment. An *external uncontrollable attribution* would be seen if a candidate said, "I didn't get the promotion because personnel lost my application." This may indicate an unwillingness to take responsibility for previous failings.

There are other factors that sway interviewers. DeGroot (1999) used videotaped interviews with 110 managers and found that a composite of vocal cues (speech rate, pauses, pitch, pitch variability and amplitude variability) correlated with judgments made by interviewers ($r=.20$, $p<.05$). In addition visual cues (smiling, physical attractiveness, gaze, body orientation, hand movement) also correlated ($r=.21$, $p<.05$) with performance. Factors such as liking, trust, and attributed credibility play a role in judgments made at interview.

Hosoda (2003) conducted a meta analysis on previous studies that explored the correlation between physical attractiveness and job-related outcomes. In a variety of job related outcomes it was seen that attractive individuals fared better. The bias was seen in professionals as well as college students, in men as well as women. However, over years the bias seems to have decreased.

Maurer (1998) conducted a study on 213 applicants for promotion in police and fire departments in a large U.S. city. Coaching attendance and preparation had a positive association with interview performance. Strategies such as role-playing and study group participation also improved performance.

1.4 SUMMARY

While grades and class rank appear to be an important predictor of success in

some non-dental health-related graduate programs, their value as a predictor of success in dental programs is less clear. Other predictors of success included some practice experience following completion of the initial dental degree, letters of reference, and the personal interview.

No studies of the selection process for Canadian orthodontic programs were identified. The availability of such studies could potentially aid existing programs in structuring their selection processes more efficiently. This information could also help potential students assess their suitability for orthodontics and prepare for the admission process. Given the lack of research in this area, a qualitative study using grounded theory was designed to identify the basic social process that underpinned the selection of students for graduate orthodontic programs in Canada.

A manuscript which outlines the findings of this study and which will be submitted to the Journal of the Canadian Dental Association is included as Part 2 of this thesis. Part 3 includes a broader presentation of the findings, integration with existing literature, and some implications for orthodontic programs, potential orthodontic students, and future research.

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Chapter 2- Paper #1

Qualitative Analysis of the Canadian Graduate Orthodontic Student Selection Process

2.1 BACKGROUND

Becoming an orthodontist is a dream for many dentists and dental students. A recent survey concluded that compared to dentists, Canadian orthodontists were more satisfied with their choice of profession (Roth, 2003). A search of PubMed and Medline databases between 1966 and the present showed very few studies on the selection procedures for orthodontic programs but somewhat more for other graduate medical programs. Despite inconsistent evidence regarding the relationship between undergraduate grades/ranking and performance (Harris 1976, Handelman 1983, Calhoun 1997, Adusumilli 2000, Borowitz 2000, Boyse 2002, , Andriole 2004, Hayden 2005), class rank/grades were given great importance in the selection process (Grantham 1993, Baker 1993, Spina 2000, Crane 2000, Bernstein 2002). This is not consistently the case, however (DeLisa 1994, Poirier 2003), and policies that restrict admission to those with the highest dental class ranks/grades have been questioned (Rinchuse 2004). In some specialties, cognitive function tests were predictive of similar tests during residency, but not of clinical performance (Borowitz 2000, Boyse 2002, Bell 2002, Carmichael 2005).

Some authors questioned the reliability and validity of selection interviews (Smith 1991, Borowitz 2000, Metro 2005). One author found that interviewers tend to select applicants like themselves (Anderson 1990). Thus, other authors have suggested that interviews may be more valid if interviewers were blinded to previous information (Macan 1990, Smilen 2001, Miles 2001), and if questions were structured (Conway 1995, Patrick 2001, Bandiera 2004).

With a limited number of training programs in North America there is an oversupply of outstanding candidates competing for few positions. A lack of consensus

among Canadian program directors results in the use of various selection procedures, and there is no literature to guide this undertaking. The purpose of this study was to address this gap by identifying qualities of the "ideal candidate, and developing a process that explained current recruitment practice in Canadian graduate orthodontic programs.

2.2 METHODS

Qualitative research methods are used when little is know about a topic of interest. Grounded theory was selected for this study because it aids in identification of a basic social process embedded in the data, and thus provides a framework for future research (Morse 1994). The research question was, "How are Canadian orthodontic students selected?" Fourteen participants from four Canadian programs were recruited: 4 program directors, 1 former program director, 2 full-time faculty members, and 7 students (Table 1).

Following approval by the University of Alberta Human Research Ethics Board, recruitment materials were mailed to interested program directors for distribution to faculty/students. Reminders were sent after a few months. Written consent was obtained from all participants. Since the sample was small, limited information about participants has been divulged in this paper to protect their identity.

One open-ended, unstructured telephone interview lasting 45-90 minutes was conducted with each participant. Examples of questions, refined over time, included:

1. Tell me about the best students you admitted?
2. Describe the selection procedure chronologically?

Interviews were tape-recorded and transcribed to facilitate analysis. Sample size was small but the dense category development and clear relationships between categories suggest that data saturation (i.e. replication of discovered information and confirmation

of previously collected data) was obtained.

Data management was facilitated using QSR-N6 (QSR International, Australia) software. Main ideas were identified and labeled using the words of the participants ("in vivo" codes). Next, broader categories were developed that grouped codes together and a core category that linked the greatest number of codes was identified. Last, relationships between ideas within the core category were specified, thus providing the basic social process underlying the selection of Canadian orthodontic students. Interview questions changed as the study progressed in order to validate the emerging theory. Reliability and validity were established using the following strategies developed by Morse (2002):

- Investigator responsiveness: Validity and reliability in grounded theory is determined by the creativity, flexibility, sensitivity and skill demonstrated by the researcher. In this study the analysis carried out by the primary investigator (an orthodontic graduate student) was reviewed by a professor at the International Institute for Qualitative Methodology, University of Alberta, with expertise in qualitative methods but none in orthodontics, and discussed in a research group comprised of graduate students in other health disciplines.
- Methodological coherence: congruence was ensured between the research question and the adopted method
- Theoretical sampling and sampling adequacy: the interview subjects were well spread-out among the four participating programs and had knowledge of the selection process. Saturation and replication implied sampling adequacy.
- Concurrent collection and analysis of data: allowed an interaction between what was known and what was needed to be known.
- Thinking theoretically: emerging ideas were verified by new data, which in turn gave rise to further ideas that were reconfirmed in previously collected data.
- Theory development: theory was developed as an outcome of the research process and as a template for further comparison and theory development.

2.3 FINDINGS

2.3.1 THE IDEAL APPLICANT

Participants were in agreement about the characteristics of the "ideal candidate." Candidates were expected to demonstrate:

Intellectual abilities:

Top grades/ranks: Successful applicants were often *"the top ten percent,"* but those without high class standing could *"compensate elsewhere."*

Research experience: Publications and research qualifications were evaluated positively.

Inquiring minds: Committees looked for *"life long learners."*

Teaching experience: Individuals with dental teaching experience were preferred.

Knowledge of orthodontics as a profession: Candidates who were knowledgeable about the profession were preferred.

Skills:

Clinical skills: There was a preference for some clinical experience.

Interpersonal skills: Arrogant applicants were seldom selected.

Communication skills: Strong oral and written communication skills were valued.

Personality traits:

Integrity: Admission was denied if there was any doubt in this area.

Altruism: Service minded individuals for whom financial returns were not the sole motivation were preferred.

Self directed: Programs sought individuals who were self directed.

Extra-curricular activities: Individuals who showed achievement in activities outside their professional work were highly rated.

Maturity: Candidates who had been out of dental school a few years were considered more mature and were thus preferred.

Ability to work under pressure: Any tests were administered under strict time

limitations to evaluate ability to work under pressure.

Creative: Ability to think "outside the box" was valued.

Perseverance: Unsuccessful candidates who improved themselves and applied again stood a better chance of being admitted.

Additional positive attributes:

Desire to enter the particular program: There seemed to be some preference given to candidates who wished to study at a particular program.

2.3.2 THE SELECTION TRAJECTORY

As shown in Table 2.2, all programs developed detailed admissions procedures. Grounded theory methods enabled the identification of a basic social process showing how the meaning of these procedures was created, and thus how the admission decisions were made. Meaning is created within a social context, so it was not surprising to find that the meaning of the admissions procedures changed slightly from one year to the next as program directors sought to respond to the needs of the profession and their program.

2.3.3 BASIC SOCIAL PROCESS (Glaser 1978): "Performing Due Diligence"

While the analysis of the data resulted in many categories, **"Collecting the evidence"** was the core category (Glaser 1978). Throughout the selection procedures, committees relied on multiple sources to provide evidence of candidate suitability. The collected evidence was used to justify selection. Applicants sought evidence of program suitability in case they had to choose between programs. There were **three stages** in the process of selecting Canadian graduate orthodontic students embedded within this category (Table 2.3). They included: Building the case for selection, Weighing options, and Finalizing decisions.

Building the case for selection: This stage included the gathering of information in the first seven steps in the selection trajectory, but the real task was the construction of the

framework that would be used to select candidates. This framework was adjusted each year based on the needs of the program and the profession. The basic structure of the framework was in place before selection began, but its final features evolved as the process unfolded each year. Thus, a candidate who was not competitive one year may be selected the following year. During each of the first seven steps of the trajectory, committee members engaged in the following phases:

Collecting evidence: The objective in this phase was to find indicators of both the pre-established framework elements and any new and interesting elements presented by applicants which might not yet be part of the framework.

Reading between the lines: Since admission to orthodontic programs is extremely competitive and practice is highly lucrative, selection committees looked for individuals seeking admission for the "right reasons." Reading between the lines, helped committees exclude applicants who aggressively tried to *"sell themselves," "curry favor"* or *"brown nose."* They also watched for applicants willing to temporarily put competitive interests aside to foster a positive learning environment.

Forming impressions: As candidates went through the selection process committee members formed impressions about them. During this phase, data developed "weight." For example, high grades were viewed very positively and tipped the committee's impression in favor of the applicant. However, some students with lower grades were still selected if they could provide other evidence, such as publications, that was of equivalent "weight."

Weighing options: After the interview, selection committees meet to create the framework of acceptability for that year, establish ranking, and determine outcomes.

Creating the framework of acceptability: Selection committee members debated their perceptions following the interview. In this phase, the framework that would be used to select students was made explicit.

Establishing ranking: During ranking prospective students were each reviewed in relation to the framework of acceptability.

Determining outcomes: This phase provided an opportunity to finalize the framework of acceptability and rank all applicants using that framework.

Concluding decisions:

During the third stage of the admissions process, committees made their final decision in two phases.

Communicating results: Applicants were assigned to one of three categories: successful, wait-listed, or unsuccessful. Successful candidates were required to confirm their acceptance within a specified time period. Those selected by more than one institution had to choose their preferred program.

Planning for the future: During the last phase of this stage, program directors spent time counseling unsuccessful applicants, if requested.

2.4 DISCUSSION

Orthodontic selection committees spend considerable time reviewing applications in order to short-list candidates for interviewing/testing. Each director thought the selection process used by their program was sound, since it yielded excellent students, and did not support the adoption of a standard, Canada-wide selection process. It should be noted that other medical specialties have reported minimal correlations between application ranking and performance (Adusumilli 2000, Borowitz 2000, Boyse 2002).

Academic performance/rank is the first criterion considered for short-listing

Canadian orthodontic applicants. Directors thought that this approach correlated well with success in their program. Similar findings have been reported by other authors (Handelman 1983, Baker 1993, Grantham 1993, Calhoun 1997, Spina 2000, Crane 2000, Bernstein 2002-3, Andriole 2004, Hayden 2005), but the literature is not unanimous on this point (Harris 1976, DeLisa 1994, Borowitz 2000, Bell 2002, Boyse 2002, Poirier 2003, Rinchuse 2004, Carmichael 2005). This inconsistency may be related to differences within the programs themselves.

This study was the first to discuss consideration of other evidence when grades/ranks were not as high as one might prefer. Canadian programs place greater emphasis on research experience then some other medical specialties (DeLisa 1994, Crane 2000).

Canadian programs prefer at least one year of practice following graduation from a dental program. This is a good strategy considering a study in Michigan in which those who had practiced for at least a year performed better than those who had immediately entered that program following dental school (Harris 1976).

While some Canadian programs welcomed international candidates, others regretted their inability to evaluate them. Directors of the latter programs recommended that international students complete dental or post-graduate training in Canada/U.S before submitting an application. In a study of internal medicine programs, Gayed (1991) found that completion of these types of postings were important predictors of success.

Orthodontic selection committees varied in the degree to which they valued other written evidence. While some program directors put great emphasis on reference letters, particularly from academics, others barely read them. This is consistent with other graduate medical programs (Baker 1993, Grantham 1993, DeLisa 1994, Crane 2000, Spina 2000, Poirier 2003). Most authors found little or no correlation between references and performance in residency (Handelman 1983, Boyse 2002), but one showed that deans' letters predicted success in emergency medicine residents (Hayden 2005).

Programs attached varying degrees of importance to applicants' letters of intent. Again, this is consistent with the literature. Emergency medicine (EM) program directors placed the least emphasis on personal statements (Crane 2000).

The relative value of the social evening hosted by some programs was difficult to evaluate. While it provided an opportunity to evaluate applicants' interpersonal skills, it was also of benefit for applicants who wished to ascertain the warmth and friendliness of potential faculty and colleagues, particularly if they were offered a position at more than one school (Marciani 2003).

There was a difference of opinion between Canadian program directors about the value of the selection interview. This finding is in keeping with research in this area. Some authors (Handelman 1983, Baker 1993, Crane 2000,) found that interviews were among the most important factors in determining selection while others questioned their reliability and validity (Smith 1991, Borowitz 2000, Metro 2005).

Participants all agreed that the focus of the interview was on personality characteristics such as honesty, team work, and *"confident humility."* The usefulness of interviews in assessing these qualities is also reflected in other health-related graduate programs (DeLisa 1994, DeGroot 1999, Spina 2000, Bernstein 2002-3). One program director lamented, however, that , *"it almost sounds like they've prepared all of their answers ... in advance. And so it comes off as rather contrived."* However, coaching, preparation, and role-playing have shown a positive association with interview performance (Maurer 2001).

Canadian orthodontic programs also valued extracurricular achievements since well-rounded students were desired. It was interesting to note that similar distinctive factors (championship athlete, officer in medical school) were found to be important predictors of success in emergency medicine residents (Hayden 2005).

The issue of potential for inadvertent bias in the selection process surfaced in several ways in this study. This problem has been identified in other graduate programs (Anderson 1990). One program director admitted that, *"professors like to pick disciples who are more like themselves."* All admissions committee members in the programs included in this study had access to the applicants' files, which has been shown to decrease interview validity (Macan 1990, Miles 2001, Smilen 2001).

On a related point, while orthodontic interview committee members often create questions they wish to ask prior to the process, there was no process in place to ensure that all applicants were asked identical questions. One participant suggested that the lack of a structured interview format may inadvertently bias the process. Arguments for and against structured interviews are complex. Some authors (Conway 1995, Patrick 2001, Bandiera 2004) have shown that structured interviews are advantageous. However unstructured interview formats have been shown to produce significantly more accurate judgments about job-related personality attributes when compared to structured interviews (Blackman 2002).

In this study, the program director and faculty worked together in a democratic manner when making their final selection decisions, thus reducing potential for inadvertent bias. A student representative was often involved, but their role varied. The structure of admissions committees and decision making processes in health-related graduate programs are not well documented, but the approach used in Canadian orthodontic programs was used in at least one other specialty (Spina 2000).

2.5 IMPLICATIONS

While several participants in this study were very satisfied with the orthodontic selection process others saw need for positive change. There was some concern expressed regarding a perceived over-supply of practitioners. One program director admitted, *"I think the big cities are getting to the point of being pretty much saturated ... certainly the income of the existing pool is going to decrease."* Programs, in consultation with the

orthodontic community, while focusing on recruiting applicants with research/academic interest, may wish to reconsider overall levels of enrolment, as well as the need to start new graduate programs in the future.

Some participants wished to see more fairness and objectivity in the process. Commercially available personality and integrity tests as well as group-based situational testing during the interview process may be considered.

Applicants may wish to use the findings of this study to learn more about *"the ideal candidate."* Increased awareness of selection factors may facilitate analysis of strengths and weaknesses when considering application to orthodontic programs. This study may also help dispel unfounded myths regarding the selection process. International applicants may benefit from the knowledge that their applications are welcomed by some programs, but that North American academic experience prior to application is preferred by others.

Further research to establish valid student performance measures and predictors of success as an orthodontist are needed. Studies investigating attitudes of unsuccessful applicants would add more to an understanding of the selection process.

2.6 CONCLUSION

Admission to Canadian orthodontic programs is highly competitive. Since academic members of orthodontic programs largely control entry into the profession, individuals who have demonstrated academic success (high grades/ranks, publications) are most likely to be selected. Given the nature of orthodontic practice however, participants in this study also stressed the importance of clinical experience, excellent inter-personal skills, a well rounded personality and evidence of perseverance.

2.7 TABLES

2.7.1 Table 2.1: Sample characteristics

Position	Male	Female	Total
Program directors[1]	5	0	5
Faculty members[2]	1	1	2
Students[3]	6	1	7
Total			14

[1]one director from each participating program and one former director

[2]faculty members from different programs

[3]two student volunteers from each of three participating programs and one from the last program

2.7.2 Table 2.2: Selection Trajectory

I	II*	III*	IV	V	VI	VII*	VIII*	IX*	X*
Pre-application	Application	References	Social evening	Tests	Clinic visit and lunch	Formal interview	Post-interview discussion & ranking	Final selection	Feedback to Un-successful candidates

*steps common to all programs

2.7.3 Table 2.3: Stages in performing due diligence

Stage I: Building the case for selection

Pre-application	Application	References	Social evening	Tests	Clinic visit and lunch	Formal interview
(A) (B) (C)	(A) (B) (C)	(A) (B) (C)	(A) (B) (C)	(A) (B) (C)	(A) (B) (C)	(A) (B) (C)

(A) Collecting the evidence

(B) Reading between the lines ("buyer beware")

(C) Forming impressions

Stage II: Weighing the options

Post-interview discussion & ranking
(D) (E) (F)

(D) Creating a framework of acceptability

(E) Establishing ranking (using a democratic process)

(F) Determining outcomes

Stage III: Conclusion- finalizing decisions

Final selection	Feedback to unsuccessful candidates
(G)	(H)

(G) Communicating results

(H) Planning for the future

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Chapter 3- GENERAL DISCUSSION AND CONCLUSIONS

3.1 INTRODUCTION

In this chapter, the methodology used in the study is explained, followed by a detailed description of the findings under the following sub-headings: The Ideal Applicant, The Selection Trajectory, and Basic Social Process. Each sub-section is complete in itself resulting in some repetition of ideas. Treatment of international applicants, need for objectivity and standardization, integration of the findings with the literature, and implications are also discussed.

3.2 METHODS

Qualitative research methods are used when little is known about a topic of interest. Grounded theory was selected for this study because it aids in identification of a basic social process embedded in the data, and thus provides a framework for future research (Morse 1994). Since the topic of interest was a process, grounded theory was the most appropriate method for this study.

The research question was, "How are Canadian orthodontic students selected?" Fourteen participants across four Canadian programs were recruited: 4 program directors, 1 former program director, 2 full-time faculty members, and seven students.

Following ethical clearance, recruitment materials were mailed to interested program directors for distribution to faculty/students. Reminders were sent after a few months. Written consent was obtained from all participants.

One open-ended, unstructured telephone interview lasting 45-90 minutes was conducted with each participant. Examples of questions, refined over time, included:

1. Tell me about the best students you admitted?

2. Tell me about the students who came short of your expectations?
3. Describe the selection procedure chronologically?
4. Tell me about international applicants?
5. Is there need for more standardization?
6. Is there need for more objectivity?
7. What message would you give to aspirants?
8. Is there anything you wish to add?

In grounded theory studies, the most common strategy for data collection is unstructured interviews. In this study interviews were collected by telephone since participants were located all across Canada. Interviews for qualitative research may be conducted in-person or via the telephone. Shuy (2001) described advantages of in-person and telephone interviews. Face-to-face interviews offer certain advantages (these may reflect limitations of telephone interviews). There is believed to be more potential of simulating natural everyday conversation. Enhanced interactive naturalness may lead to more accurate responses as well as self-generated answers. There is greater potential of escaping power asymmetry i.e. putting respondents in a subordinate relationship to the questioner. Complex and sensitive issues may be dealt with more effectively. Hearing-impaired or older individuals may be more comfortable. Visual clues available to the interviewer may encourage more thoughtful responses. In-person interviewers typically have a lower workload that may lead to more accurate results. Response rates are believed to be better. Marginalized respondents (e.g. African Americans, Hispanics, the poorly educated, and the elderly) show improved response rates. However telephone interviews offer several advantages. With telephone interviewing there is a reduction of interviewer effects since they can be monitored more easily. There is more uniformity in the delivery of interviewers, again because of closer monitoring and easier training. Questions can be asked in identical ways thus allowing greater standardization. Safety of the researcher is enhanced. The technique is also more cost effective and results may be obtained faster. The primary reason for using telephone interviews in this study was related to cost. The use of telephone interviews made data collection from participants located across Canada affordable.

Interviews were tape-recorded and transcribed to facilitate analysis. Sample size was smaller than expected but the dense category development and clear relationships between categories suggest that data saturation was obtained.

Data management was facilitated using QSR-N6 software. Main ideas were identified and labeled using the words of the participants ("in vivo" codes). Next, broader categories were developed that grouped codes together and a core category that linked the greatest number of codes was identified. Last, relationships between ideas within the core category were specified, thus providing the basic social process underlying the selection of Canadian orthodontic students. Interview questions changed as the study progressed in order to validate the emerging theory. Reliability and validity were established using strategies developed by Morse (2002):

- Investigator responsiveness: Validity and reliability in grounded theory is determined by the creativity, flexibility, sensitivity and skill demonstrated by the researcher. In this study the analysis carried out by the primary investigator (an orthodontic graduate student) was reviewed by a professor at the International Institute for Qualitative Methodology, University of Alberta, with expertise in qualitative methods but none in orthodontics, and discussed in a research group comprised of graduate students in other health disciplines.
- Methodological coherence: congruence was ensured between the research question and the adopted method
- Theoretical sampling and sampling adequacy: the interviewees were well spread-out among the four participating programs and had knowledge of the selection process. Saturation and replication implied sampling adequacy.
- Concurrent collection and analysis of data: allowed an interaction between what was known and what was needed to be known.
- Thinking theoretically: emerging ideas were verified by new data, which in turn gave rise further ideas that were reconfirmed in previously collected data.
- Theory development: theory was developed as an outcome of the research process and as a template for further comparison and theory development.

The primary researcher in this study was an orthodontic graduate student with an international background, who may have had some bias. However the study was closely supervised by a non-orthodontist professor from the International Association for Qualitative Research with input from a research group comprised of graduate students in other health disciplines, who found similar themes.

3.3 THE IDEAL APPLICANT

Participants were in agreement about the characteristics of the "ideal candidate." Candidates were expected to demonstrate:

(I) <u>Intellectual abilities</u>:

1. Top grades/ranks: Successful applicants were usually top students. One program director admitted *"Number one, you've got to do well academically as compared to your classmates. It's not something that we sort of demand, but it's just the reality of the applicant pool that applies for orthodontics."* Candidates were expected to be at least in the top half of their class. Some preferred *"the top twenty-five percent"*, others *"the top ten percent."* While higher class ranks put applicants in advantageous positions over others, they were not the sole selection criteria. A director summarized *"the applicant pool for orthodontics are extremely good academically, and they usually bring a lot more than just their academic performance to the table."* Candidates who lacked a high class standing could *"compensate elsewhere"* as follows.

2. Research experience and interest: All Canadian orthodontic programs had a master's thesis component. Thus, in addition to grades and rank, the ability to demonstrate research interest and experience was extremely important. One program director stated *"You can almost not get into (name of program) any more unless you have previous research experience."* The others too stress research, though not to that extent. Research offered an opportunity to those without top grades to become competitive applicants. The

very fact that the candidate had engaged in research activity was more important than the quality of the research or journal. However, if the researcher had won an award for their research, they would be viewed as a very competitive candidate for admission. Candidates who had already completed another graduate degree, and thus brought formally recognized research qualifications e.g. MSc or PhD, were evaluated very positively.

3. Inquiring and analytical minds: The ability to demonstrate an inquiring and analytical mind, beyond the domain of research, was the third characteristic of the ideal applicant. Programs looked for people who show evidence of being *"life long learners."* Applicants who wanted to *"study for the sake of knowing things and being a better clinician for it" were* considered to be excellent candidates for Orthodontics. Evidence for this was found in *"what courses might they have taken to expand themselves on the horizon"*. A faculty member asked candidates who have previously treated orthodontic patients, *"why do they need to come to a specialty program when they're already doing orthodontics? And then obviously the right answer is to learn to actually do it properly because they've learned that they have limitations."* To evaluate analytical ability, a director stated that during the interview, *"I like students to be able to figure out what the question was and answer it specifically and directly."*

4. Teaching experience: A profession needs teachers to be self sustaining. There is a crisis in orthodontics as fewer graduates embark on an academic career. A program director therefore states, *"I like it if people have had some teaching experience ... who's come back to the university and done some teaching."* This was reiterated by several others.

5. Knowledge of orthodontics as a profession: It was important for candidates to be able to demonstrate a knowledge of the profession i.e. they should know what they are getting into and why. A program director stated, *"a typical good applicant, number one, would be very passionate about the whole topic. They were well informed; they knew what orthodontics was."* It was considered beneficial for candidates to have read some

of the orthodontic literature, show awareness of controversies and new developments, taken continuing education courses, participated in cleft palate clinics, study clubs, and conferences and visited orthodontic offices. During interviews, a program director explained, *"if they can describe why they became interested in doing this and they can describe more specifically a person that mentored them into this process, that sort of thing, I think that that shows a depth, so I think that that's important."* Committees preferred to see candidates focusing on the positives of the orthodontic profession rather than running away from challenges of dental practice. One director gave an example of a common reason he did not wish to hear from candidates, *"I want to be an orthodontist because I hate doing dentistry." That's a very common one, by the way."* Candidates thus needed to demonstrate knowledge and a long term interest in the profession to convince selection committees of their seriousness.

(II) <u>Skills</u>:

1. Clinical skills: Orthodontics is a practice discipline. For this reason, intellectual ability alone does not define the ideal applicant. All program directors stated that applicants must possess excellent clinical skills.

Canadian programs rarely accepted students directly from dental school. There was a strong preference for at least one year of private practice or a General Practice Residency experience; more years of experience were often preferable, particularly if a students grades were lower, or if they lacked research experience. A faculty member declared, *"my best residents at the moment are the ones that have a little bit of experience in private practice. They're a little bit older, so they're not the ones that really come out and do a year of residency in something and then come into orthodontics."* This was corroborated by a program director who stated, *"most of them have had a bit of clinical experience beyond—they've been in practice for a couple of years, something like that, and they generally would have run a fairly successful private dental practice."* However too many years spent outside dental school may be viewed negatively, since a faculty member reported *"... problems with older residents because*

it's very hard for a resident who graduated ten years and then practiced for ten years or whatever, and tried to be a student again."

To evaluate clinical skills programs offered *"manual-dexterity exercises i.e. wire-bending exercises."* However another program director saw little benefit in that exercise stating *"the students we select are in the top three, four percent of the graduating classes in dentistry, which, to a high extent, manual dexterity plays a large part in how they would do academically."*

2. Interpersonal skills: Clinical skills were not sufficient to define the ideal candidate. Interpersonal skills and ability to work as part of a team were also required. These skills were evaluated based on the letters of reference, social evening, interview, interaction with department members, and resident's / staff's previous knowledge of applicants.

Participants used the following descriptions for interpersonal skills they considered favorable: *"a good sense of humor, and serious at the same time," "a charming personality," "easy to talk to, easygoing," "willingness to help others," "fit into a team and complement learning of others," "character adaptation, whether someone has the capability to adapt to different situations," "friendly and able to interact with other people," " more talkative, more outgoing," "well grounded or rounded," "a joy to be around," "well groomed, attentive, thoughtful," "capable of empathy," "confident humility,"* ability to deal with *"confrontational questions," "well thought out," "nice," " didn't always take themselves too seriously and tried to sort of see the other side of things," "chatty, easygoing," "a good people person,"* and *"excellent, excellent social skills; very enjoyable."*

If letters of reference conspicuously omitted any mention of a candidate's interpersonal skills, this might be viewed negatively in the short listing process. Candidates who had shot themselves the foot were the ones that *"have an arrogant personality," "only want to talk about themselves; they don't want to sort of have a conversation that goes two ways," "obnoxious," "self-important and bragging about his*

accomplishments," "interrupt and override other conversation," "condescending," "completely independent and don't want to interact with other students" "thought they already knew everything about orthodontics," "getting so drunk that you can barely walk" "no ability to work with other people, not cooperative ... being rigid in their responses," "not treating staff with respect or the staff finds them difficult to interact with," "tend to be cocky and overconfident," " not a person who is teachable," "too rigid," "joking around a little too much ... very buddy-buddy," "extreme. Some people can be too extroverted, and they come in and they totally try to control the interview; you can't shut them up to get on to the next question. So some people are overly aggressive that way, which I think hurts them. Some people are so introverted you can't get the information out of them. But other than that, it's just those two extremes where, I think, it would have a negative impact on the selection committee." Body language too could work against a candidate, as explained by a resident, *"The tone of voice, the body posture, the expressions, all that kind of stuff were so arrogant and self-important, it was just ridiculous ... with the combination of other nonverbal and verbal inflections and things that don't come across in the written word, it was quite hard to handle."*

3. Communication and writing skills: Candidates with excellent communication skills had a distinct advantage during the selection process. A resident on the interview committee described one of the interviewees with excellent communication skills as *"attentive, thoughtful, didn't seem to have canned answers. He was able to answer the questions in a straightforward, articulate manner, sometimes having to pause, obviously, and think about it. But the answers were to the point, they weren't rambling, they weren't confused, and ... the conviction was shining through."* One of the program directors gave the following advice to an unsuccessful applicant regarding his communication skills, *"You are too shy. Show you have some character. Show what you are in life. When we ask you a question, you are just trying to say something, and you mumble; you don't pronounce—it doesn't look like you have character; it doesn't look like you have something inside. Show that you're there. Show that you are going to be a leader."* The candidate improved and was accepted the following year. Another program director believed that *"public speaking is an important part of orthodontics"* and therefore

required candidates to make a three minute presentation on any topic in orthodontics as part of the evaluation process.

Writing skills too were important as seen in the letter of intent. One program director stated, *"I look at the way they're written and students' ability to express themselves with clarity without just rambling on and on. So I think that that is probably, from a student's application point of view in terms of the style of the application, is probably the most important. So if they have a nicely styled CV that goes along with it, I guess, that's easy to figure out what's going on, that's probably helpful. There's some penmanship, I suppose, attached to it. But most of the students have got that figured out pretty well."* However another program director discounted the value of the letter of intent stating, *"they're going to an English major and getting them to write their letters for them. So yes, I read through it, but I don't pay much attention to it."*

Knowledge of English (or French at the University of Montreal) was also evaluated. The TOEFL (Test of English as a Foreign Language) is a basic requirement for overseas candidates. *"Cultural differences"* could be a challenge in evaluating those with an international background.

(III) <u>Personality traits</u>:

1. Honesty and integrity: A program director stressed that honesty was the most important requirement in a successful applicant saying, *"especially I want to have people that are frank, okay? Honest, frank; they say the truth. So this for me, it's mainly what I'm looking for."*

Some candidates made visits even before applying, ostensibly to learn about the program. If members of the selection committee felt they were trying to *"brown nose"* it could act against them. A faculty member stated, *"What I think a good letter of intent is that when you read it, you actually believe what the person wrote in it, that it comes out as sincere."* A program director disliked the following in the letter of intent, *"some*

people ... mention things that I think are inappropriate, like family situations or some things which really we'd just rather not know ... it's almost like they're trying to drum up sympathy or whatever." Programs gave more weight to letters of reference from people who have in the past been forthright about candidates. During the social evening and clinic visit, candidates often opened up to the current students. Selection committees used this as an opportunity to gain insights into the candidate's true character. One program director said, "*Sometimes applicants, they say one thing inside the interview, but they'll say something else when they're talking casually to the other students."* During the formal interview a faculty member explained, *"I guess it's more the feeling that you know they're honest, and the interviewees that did well ... were truthful rather than trying to stop and give a really rehearsed answer every time ... Actually, the ones that we accepted were the ones that were more honest more than anything."* Program director actually framed questions to evaluate candidate honesty, e.g. *"people say, "Oh, yes, I read a very interesting orthodontic article," and then, well, the next question is , obviously, "Well, could you tell us a little bit about it?" Don't dig the hole unless you've been there."* Moreover, interviewers sometimes tried to provoke candidates, as explained by a student, *"you never know if one guy or a lot of people on the selection committee are going to be rude with you to see if you have a good personality, if you have character, if you stick to your answers and not change answers each time they give you another argument."* Programs thus used the many steps in the selection procedure to probe for inconsistencies in how the candidates portray themselves, as described by a student, *"people that were able to show that they were congruent; that what they were showing as a person, as a candidate, and what they wrote in their application, if everything was just kind of congruent, then that assured the program that they could trust more in that person."*

2. Altruism and ability to move away from competitiveness: Orthodontic practice can be very lucrative, and programs try to avoid recruiting candidates for whom this is the sole motivation. A faculty member reported that one of the interviewers asked the following question: *"Why do I feel like you're here, and all you really care about is getting into orthodontics and making lots of money? Prove to me that that's not the*

case." One program director gave examples of candidates who destroyed their chances of gaining admission when they said during the interview, *"Well, I want to be an orthodontist because I just want to make more money than my friend."*

Desirable candidates were described as those that *"participate in the community," "do charity work," "volunteered in many research projects for free," "worked as a volunteer teacher- teaching assistant," "interested in the program and what they can do for the program," "have had some degree of volunteerism ... altruistic nature ... somebody who's volunteered or been to Bolivia and worked, done some dentistry on the poor and that sort of thing," "are community centered," "did some charity work with some inner-city clinics that were offering dental service for free," "are a Big Brother," "work for the soup kitchen,"* and *"are helping under-serviced communities."*

There was another aspect to altruism that came up during the interviews, particularly with the students, one of them who remarked, *"a lot of people, to get into ortho, they need to be extremely competitive, and it's a trait that's sometimes ingrained in us so deeply that it's very difficult to erase."* Programs desired candidates who were able to move away from competitiveness and facilitate a positive learning environment.

3. Self directed and hard working: In a professional program, self directed individuals out perform others. All programs wanted students willing to *"work hard."* One program director stated, *"To my mind, the best students that I've had have been those who have been self-starters."* A student provided an example of a candidate who came off poorly during the interview for this reason, stating, *"during the interview, the candidate had a little bit of concern regarding how structured the program was in the sense that he wanted to be directed into a learning process instead of being self-directed when it comes to learning ... because of that he was ranked lower at the end of the interview process."*

4. Extra-curricular activities: It was not enough to have the highest grades in dental school. Programs were looking for *"well balanced individuals."* Post graduate education is extremely demanding and those who have shown an ability to successfully commit to

multiple activities were considered better able to cope with the rigors of training. Successful candidates needed to have, in the words of a program director, *"a lot of outside activities and outside creative interests or accomplishments."*

Programs preferred candidates with some of the following qualities (these were repeated over and over again): *"ride horses in their part time or play the piano or do something like that, or some other sport or interest," "helping out with the school, in student politics, things like that," "also has a life outside of school, shows that they're actually human, are they married; do they have children? ... travels worldwide or is in a symphony orchestra and plays this instrument ... involved in professional sports that was able to travel internationally," "artists; some of them Grade 5 in piano; some of them play the guitar; some of them—a lot of them—paint, do art; some of them fix up old cars... got creative interest outside of dentistry in a sense ... were in university politics or university athletics, or they've been creative in a music sense, art sense, or somebody that brings something a little bit extra rather than just being a basic student ... coach a kids' hockey team? Have they been a swimming instructor?" "class president ... president of the Dental Students' Society ... leadership."*

5. Maturity: Canadian programs preferred mature candidates. A program director stated that, *"people that have a little bit of experience, at least three or four years after graduating from the dental school, are best students."* However, too many years out of school may not be beneficial and program directors agreed that, *"if they are too, too long outside of school before entering the program—for example, eleven, twelve, thirteen years, and they are entering the program—I can see they are still very good as far as practice is concerned, but they have a little more difficulty about learning, so the theoretical part of it is a little more difficult for them."*

6. Ability to work under pressure: Programs wanted individuals, who in the words of a student, *"deals with stress well."* Any tests were administered under strict time limitations to evaluate ability to work under pressure.

7. Creative: Ability to think "outside the box" was valued. The demands of clinical practice, business management, research and development in a progressive discipline such as orthodontics requires a creative bent of mind. This was explained by a faculty member as follows, *"In orthodontics, we usually deal with different patients ... so you have to be creative."*

8. Perseverance: Unsuccessful candidates who improved themselves and applied again stood a better chance of being admitted. A program director gave the following example, *"we've had a guy that we accepted recently that, I think, applied for four years before the person got in. And I mean, what he went and did is some additional graduate study; he did additional research, submitted publications, went to orthodontic conferences. Really walked the extra mile to get in, and that perseverance is something that we like to notice as well."* However candidates who applied several times but did nothing to improve may have been wasting their time as stated by a director, *"If I have somebody who came here for interview and applied again the next year and had done nothing to improve themselves in that year, I wouldn't invite them back for interview."*

(IV) <u>Additional positive attributes</u>:

1. Desire to enter the particular program: There seemed to be some preference given to candidates who wished to study at a particular program. A student declared, *"I think most of the programs want someone that is really interested in getting into that particular program and not getting into any program."* Another stated that programs wished to enquire of candidates, *"do they actually know anything about the school or about the province that would show that they were actually interested? ... if you're truly interested in a program, you should know a little bit about it. You should know a little bit about the place it's in."*

Programs expected candidates to apply to several other programs. If they had not it may show a lack of seriousness as explained by a student, *"I only applied to one university. It was maybe a mistake in retrospect ... people that only apply to a couple*

schools, really, they should be applying to every one they can; otherwise it shows they're really not committed to this decision." However, if candidates applied to other specialties it may have worked against them. A program director stated, *"I wouldn't even consider an applicant that had applied to two of our programs at the same time."*

3.4 THE SELECTION TRAJECTORY

The programs included in this study varied in the number of steps included in their selection trajectory. The steps listed below are a comprehensive list, but only steps (II, III, VII, VIII, IX, X) were included in all programs.

(I) Pre-application
(II) Application
(III) References
(IV) Social evening
(V) Tests
(VI) Clinic visit and lunch
(VII) Formal interview
(VIII) Post-interview discussion and ranking
(IX) Final Selection
(X) Feedback to unsuccessful candidates

(I) <u>Pre-application</u>: Prior to being invited for the interview (and usually before submitting applications) some candidates contacted programs informally. They visited program web sites, emailed program directors, made appointments to meet with them, sat in on lectures and seminars and toured the clinics. Visits allowed candidates to learn more about the program, gain a better understanding of the selection process, get comfortable talking with the program director and therefore feel less intimidated at the interview stage, show initiative and allowed them to *"sell themselves."* If candidates were perceived to be *"trying to curry favor"* it would hurt their chances; for this reason some programs discouraged such visits.

(II) Application: The deadline for receiving applications was usually late summer to fall, for admission to the next year's program. Along with a completed application form, candidates typically submitted a Curriculum Vitae and a letter of intent (biographical essay); some programs charged an application fee. International students from non-English speaking countries submitted TOEFL (Test of English as a Foreign Language) scores for programs where English was the medium of instruction. While some programs welcomed international applicants, others regretted their inability to evaluate them. Incomplete applications were usually rejected; in some instances the administrative assistant contacted an applicant requesting further documentation. Programs reported receiving between forty five and seventy applications a year. A short list of ten to twelve was typically made by the program director, acting alone or in consultation with members of the selection committee.

An assessment of grades and rank comprised the first step in the short listing process. Grades and ranks were evaluated from the application forms, transcripts and Dean's letter. The latter was important since some programs did not rank candidates. After considering grades, a program director stated, *"Then I start looking now a lot of times at what other things they've done and whether there's any sign that they've got interest in learning for the sake of learning. So what courses might they have taken to expand themselves on the horizon? Have they done any kind of research work and done any kind of publication work?"* Candidates who lacked a high class standing could *"compensate elsewhere"* e.g. with experience in research, years of private practice, performance in another master's program, extra-curricular activities, leadership, volunteer work, evidence of perseverance (multiple applications, *"jump through the hoops"*, *"paid his dues"*) etc. Research offered an opportunity to those without top grades to become competitive applicants.

Faculty members laid varying degrees of stress on the letter of intent. One program director stated, *"the most important part of the application form for us was their biographical essay. See, in a biographical essay we got a sense of how good was their*

writing skill, their communication in English. And from a content point of view, we were interested in what they do with their life. What were they planning to do in the future with their life? Why were they wanting to do orthodontics" Another program director agreed saying, *"I look for something somewhat unique or special about those, and sometimes they can impress me ... if they have a nicely styled CV that goes along with it, that's probably helpful."* However another program director discounted the value of the letter of intent stating, *"they're going to an English major and getting them to write their letters for them. So yes, I read through it, but I don't pay much attention to it."* One program had not required a letter of intent, but planed to make it mandatory from this year.

A few years of experience following dental school were preferred. So was teaching experience, involvement and achievement in extra-curricular activities, and evidence of an altruistic nature.

(III) <u>References</u>: All programs required letters of reference. Typically, as one program director stated, *"we ask for three letters of recommendation from teachers... that know the students pretty well."* According to one director, *"Letters of reference from deans are almost always irrelevant except that the dean can tell me where they stood in their class because deans don't know any students."* However another director ascribed more value to the dean's letter saying, "*if the guy did cheat one day or things like that, most of the time they will put that in the letter."* References from non- academics may not have carried as much weight.

Choosing a credible referee was a good strategy when one considered what a program director had to say, *"If it's people we know writing the reference letter and we know these people are sort of honest and are going to give an accurate appraisal, I think I put a lot of weight in some of those reference letters."* A program director reported occasionally calling up referees to gain further insights into the character of candidates. Another mentioned being very impressed if, "*... (the referee) had made a special point of personally recommending them over and above, usually a phone call."*

A credible reference was, according to a program director, firstly "*one that's come, obviously, from the referee in a separate envelope.*" One of the program directors stated that, "*a good letter of reference talked about what we would call academic skills: research skills, analytical skills, communication skills. Also, a good research letter would talk about personality skills—how they treat patients, how they work with colleagues, how did they work with their superiors, how do they treat the staff—because a good letter tells us things that we don't find on the transcript. So we want letters that tell us things about their personality, their behavior, other activities like research, study clubs—things that are not on the transcript.*" Another stated, "*I look at their letters of recommendation and try and sort out ones that are sort of where the referee has put in a little extra effort in terms of writing a report.*"

Candidates may fail the short list if their reference letters are uninformative. One program director was very dismissive of reference letters. He stated, "*I don't pay much attention to the referees' letters ... No one ever says that they're really bad; they're normally all excellent ... And the more glowing they are, the less attention I pay to them actually.*"

A program director expressed his inability to evaluate non-Canadian/U.S. applications since, "*I don't know these people, and they're all really glowing, but I just don't feel like I really have any ability to judge any of that. I don't think necessarily because they've been successful in a third world country that they're going to be successful here.*"

Selection committees used information gathered from the application, curriculum vitae, biographical statement and letters of reference to make a shortlist of candidates who would be invited to visit the program. All required a formal interview, while some hosted a social evening, a clinic visit, lunch and some tests.

(IV) Social evening: This was usually held the evening prior to the formal interview, *"at a site away from the school."* Some programs had their student's act as hosts, while in others the entire selection committee attended. A program director admitted to evaluating candidates at the social meet. He said, *"the objective of that is to, first off, get to know the student on a little different level, see how they interact with the students and things. Also it makes them hopefully a little bit more comfortable when they come for the interview because they've already seen the faces and things."* Another reason, as explained by a student was, *"to try to convince them that "this is the best place for you."*

(V) Tests: Some programs also administered tests to candidates that were invited to an interview. These include wire bending to evaluate manual dexterity, literature evaluation, a mini-quiz (a written test), and a three minute formal presentation on an orthodontic topic of the applicant's choice. A program director elaborated, *"the formal written test that we give them. It's something like, "Name two orthodontic journals you've read recently," "Who was the father of orthodontics?" "How much orthodontics do you do in your private practice?" It's something that they don't have to study for ... try and find out if they're altruistic, if they are community centered, what's their reasons for wanting to do orthodontics? How important is the research to them? If you're accepted in the two-year or three-year program, which one will you choose, and why? If you're accepted into a program, one that has a research component and one that doesn't, which one will you choose, and why? Of course, here they all say they will choose the longer three-year program and they will the research because that's what our program is and they think that's the answer we want. But I mean, we can see through those things already. There's some standard questions that always get the same answer. And then we ask them what research they'll be interested in, how they're going to go about planning their research project, things like that."* The purpose of all these tests was to get a better understanding of the skills and abilities of each candidate.

(VI) Clinic Visit and Lunch: This was described by a student as, *"a direct mirror of the previous night (i.e. social evening)."* Candidates learned about the program, while interacting and being evaluated by the students/staff.

(VII) Formal interview: All programs required a formal interview. Some, in addition, had a series of mini-interviews. A Program director explained the objective, *"at the interview process I would attempt to put their academic record aside entirely and focus on my perception—and not just my perception, because there's an interview committee at that point—perception of whether or not they would fit into a team and complement learning of others as well, ... And then, again, trying to sort of see if there's any sort of spark of real curiosity and sort of drive and initiative within the person."* Another director speaking about the interview committee said, *"different people have different focuses. The more research-oriented people have very research type questions; the more clinical people were more interested in what I would call professional behavior type questions."* Students were represented on the committee in some programs. Successful candidates tend to be, *"confident, well thought out, humble people."* Most importantly they should be, *"honest ... say the truth."*

(VIII) Post-interview discussion and ranking: After the interviews, the selection committees met to rank-order candidates. A program director stated, *"we discuss it, and if people sort of ranked somebody particularly high or particularly low, we talk about their perceptions, what made them do that."* Another program director described what happens next, *"majority rules; nobody's decision is weighted any more than anybody else. So what we basically do, we all would list our candidates in the order in which we want to see them selected, and then we add the numbers together. I mean, if you're number one on three lists, that would be three; number two on a couple of lists, that'd be, two and two is four; so that'd be a total score of seven. And that's the way we rate them, and then we pick those with the lowest numbers. The lowest number would be number one."* A third program director agreed, *"at the end of the day it becomes an arithmetic process."* All Canadian programs followed a relatively similar protocol with small variations.

(IX) Final selection: After establishing the rank order, a program director stated, *"I will contact them and offer the people that were the first choices a position; they'll be given*

about three days to determine whether or not they want to come in, or up to a week. All the Canadian programs work together, and we notify the candidates on the same day that they would be accepted and then they're all given the same amount of time to make a decision whether they want to accept our program or not. And also the Canadian programs have an arrangement amongst ourselves so if somebody accepts a position at the U. of __, I immediately contact the other programs, and they delete that person off their list. And that stops people from accepting one position and then changing their mind and going somewhere else. Once they've accepted one position, they're no longer considered in another program in Canada. Then when those students have made up their mind, if they choose (our university), then we're done; if they choose somewhere else, then we go on to our alternates in rank order. And each one then gets offered a position, and then each one of them just gets given a day or two to make a decision after the first time."

(X) <u>Feedback to unsuccessful candidates</u>: Program directors spent time counseling unsuccessful applicants when requested. One of them stated, *"I encourage them to come in and sit down with me and go over how they, number one, might improve their transcript, what they can do to perhaps look more positive, or how they could have perhaps done better in the interview process."* However another regretted, *"in this litigious society I don't think you can tell them specific things because next year they'll expect to get in if they, "Well, I did this and this and this," therefore I should get in... So the feedback we give is general feedback."*

Candidates who applied again with significant improvements were looked upon very favorably, as explained by a director, *"we've had a guy that we accepted recently that, I think, applied for four years before the person got in. And I mean, what he went and did is some additional graduate study; he did additional research, submitted publications, went to orthodontic conferences. Really walked the extra mile to get in, and that perseverance is something that we like to notice as well—somebody who perseveres and continues to persevere and continues to try and improve the deficiencies. And this is*

a person with a mediocre GPA who had to go and do additional things and eventually got in just because, I think, that perseverance is something that we're looking for as well."

3.5 BASIC SOCIAL PROCESS (BSP): "Performing Due Diligence"

While the analysis of the data resulted in many categories, **"Collecting the evidence"** was the core category (Glaser 1978). The goal of grounded theory is to generate theory around a core category which accounts for most of the variation in the behavioral pattern under study and is related to the other categories. It must therefore be central, recur frequently, relate to other categories, have clear grabbing implications and carry-through. In the current study, it was clear that throughout the selection procedures, committees relied on multiple sources to provide evidence of candidate suitability. The collected evidence was used to justify selection. Applicants sought evidence of program suitability in case they had to choose between programs.

The Basic Social Process (BSP) is embedded in the core category and is processural (i.e. involves change over time) with two or more clearly emergent stages (Glaser 1978). It explains how meaning is attached to social interactions. The fundamental pattern in the organization of social behavior as it related to the selection of Canadian orthodontic students over time was **"Performing Due Diligence."** This process explains how meaning was attached to the information collected during the selection trajectory. This process resulted in the selection of the "best" candidates, those who came closest to the characteristics of the ideal candidate.

Thus there were **three stages** in **Performing Due Diligence.** They included: Building the case for selection, Weighing options, and Finalizing decisions.

Table 3.1 Stages in performing due diligence

Stage I: Building the case for selection

Pre-application	Application	References	Social evening	Tests	Clinic visit and lunch	Formal interview
(A) (B) (C)	(A) (B) (C)	(A) (B) (C)	(A) (B) (C)	(A) (B) (C)	(A) (B) (C)	(A) (B) (C)

(A) Collecting the evidence

(B) Reading between the lines ("buyer beware")

(C) Forming impressions

Stage II: Weighing the options

Post-interview discussion & ranking
(D) (E) (F)

(D) Creating a framework of acceptability

(E) Establishing ranking (using a democratic process)

(F) Determining outcomes

Stage III: Conclusion- finalizing decisions

Final selection	Feedback to unsuccessful candidates
(G)	(H)

(G) Communicating results

(H) Planning for the future

Stage I: Building the case for selection: This stage included the gathering of information in the first seven steps in the selection trajectory, but the real task was the construction of the framework that would be used to select candidates. This framework was adjusted each year based on the needs of the program and the profession. The basic structure of the framework was in place before selection began, but its final features evolved as the process unfolded each year. Thus, a candidate who was not competitive one year may be selected the following year. During each of the first seven steps of the trajectory, committee members engaged in the following phases:

(A) Collecting evidence: The objective in this phase was to find indicators of both the pre-established framework elements and any new and interesting elements presented by applicants which might not yet be part of the framework. Pre-application visits allowed candidates to get a sense of the programs, but not the opportunity to be evaluated by selection committees. The latter happened when applications and references were submitted. More information was obtained from applicants with the best credentials invited for the social evening, tests, clinic visit/lunch and formal interview.

(B) Reading between the lines: Since admission to orthodontic programs is extremely competitive and practice is highly lucrative, selection committees looked for individuals seeking admission for the "right reasons." Programs were aware that pre-application visits were sometimes made in order to *"brown nose"* and were therefore reluctant to spend time evaluating candidates at this stage. Contact by parents or relatives would be viewed negatively. Committees usually considered class rank as being more important than grades/marks due to variation between schools. However they looked for more since there was an awareness that those with the best ranks did not necessarily make the best orthodontists. While improvement was valued, inconsistency in grades was taken as a sign of unwillingness to *"apply themselves on everything."* Grades in the clinical subjects received more importance than those in the basic sciences, since they included an evaluation of clinical skills. In the letter of intent, attempts to *"drum up sympathy,"* excessive use of *"I," "I," "I,"* (considered a sign of being *"egocentric"*), criticism of other orthodontists and stress on financial goals were reasons for concern. Candidates

practicing for several years were perceived to have potential difficulties with getting back to a hierarchal academic environment. One director discounted the value of the letter of intent saying they were probably written by an *"English major."* A faculty member looked for signs of honesty saying, *"What I think a good letter of intent is that when you read it, you actually believe what the person wrote in it, that it comes out as sincere."*

References must be credible in order to be taken seriously. A credible reference was, according to a program director, firstly *"one that's come, obviously, from the referee in a separate envelope."* Letters of reference from overseas individuals, practicing orthodontists and even the dean were considered less valuable than those from respected academics who knew the candidate well and had in the past provided honest references. *"Personalization"* or an extra *"phone call"* were highly appreciated. In fact, a program director reported occasionally calling up referees to gain further insights into the character of candidates. Programs rarely got references that were directly critical, as explained by a student who had been on the selection committee, *"if nothing outstanding has been written about the person, if it's pretty much just the standard reference that you can read between the lines and it says that "this person was reasonable, but I didn't really know them personally" or "they never really struck me as outstanding or brilliant," then again there's a casting off of that group."* However, sometimes referees mentioned things like excessiveness competitiveness that hurt a candidate's chances.

Reference letters could be misleading as explained by a director, *"you always can go wrong once in a while. It's almost impossible to judge everybody exactly the way they are."* Another program director was very dismissive of reference letters. He stated, *"I don't pay much attention to the referees' letters because the only good referees' letters are those that say that the candidate is bad and you shouldn't take them ... the more glowing they are, the less attention I pay to them actually."*

The social evening and clinic visit/lunch that were part of the appraisal process in some programs provided an opportunity to *"get to know the student on a little different level, see how they interact."* A student stated, *"there's an interview process the night*

before, an informal interview process ... It's not a secret; it's just not told to them. It's trying to get an objective feel for their personality, and they may react differently; they may feel interviewed if they know that you're on the interview committee. And we have found that by talking to the program director the next day, he gets a different conversation with these guys than we do." Arrogance, poor social skills and a lack of integrity sometimes surfaced in those settings. During the lunch and clinic visit candidates can inadvertently reveal their true nature, as one director explained, "*People are very honest when they're talking to students, especially if they don't think you're going to say anything to anybody else."* However all programs did not give the same weight to student preferences. One program director explained, "*residents often pick vastly different people than the committee eventually decides to choose ... the more single, unmarried people, you have those residents, I think, the more they look for the party animal in the person."*

Some programs administered tests to evaluate candidates from several perspectives. Manual dexterity, altruism, ability to function under pressure, public speaking, etc. were evaluated.

While one director felt that, "*the interview was the most important thing,"* another declared, *"the interview is probably the weakest link in the whole thing. I think interviews tend to make the extrovert shine. And the polished public speakers shine. And I don't think you necessarily get real good insights on people. So I'm personally rather cynical about what that contributes to the process."* Thus even at this stage, committees were reluctant to accept everything at face value. While grades/ranks were important for initial short-listing, they received minimal importance in subsequent stages. One director stated, *"when they come for the interview ... You don't have to judge the grades any more."* Committees often had candidates elaborate on issues that were unclear in their applications and even asked *"questions that are quite annoying"* to gain insights. Honesty and spontaneity were appreciated. Interviewees were often allowed to ask questions which provided further insights to committees. A dislike of dentistry or children, a lack of interest in research, excessively high opinion of ones own knowledge

or self and an inability to answer questions precisely were not appreciated. Programs also watched for applicants willing to temporarily put competitive interests aside to foster a positive learning environment. A student who had been on the selection committee gave an example of a candidate who seemed to say the correct things, yet his body language gave him away, *"If you would read the transcript of his interview and try to pick off the transcript, you'd still pick that guy. But his personality shone through to the extent that you just couldn't when you were actually present in the room. The tone of voice, the body posture, the expressions, all that kind of stuff were so arrogant and self-important, it was just ridiculous ... with the combination of other nonverbal and verbal inflections and things that don't come across in the written word, it was quite hard to handle."*

While some programs welcome international applicants, others regret their inability to evaluate them.

(C) Forming impressions: As candidates went through the selection process committee members formed impressions about them. During this phase, data developed "weight." For example, high grades were viewed very positively and tipped the committee's impression in favor of the applicant. One program director admitted *"it's really academic performance to a large extent that most of us utilize as the gauge for short listing."* Candidates were expected to be at least in the top half of their class and those with higher ranks often held an advantage. It must be stressed that grades reflected more than just the ability to recall facts. They were also a reflection of clinical ability as explained by a program director, *"if they've got really good hands during their general dentistry program, then, obviously, that would be reflected in their grades from the clinical side of things."* While higher class ranks put applicants in advantageous positions over others, they are not the sole selection criteria. One director explained *"when I've got it down to the ones that I think should have all the academic abilities to be able to come to the program, it doesn't seem to me that it should really matter if they're first or fifth in a class of thirty-eight; they all certainly would have the capability of performing well in graduate studies."* After considering grades, a program director stated, *"Then I start looking now a lot of times at what other things they've done and whether there's any sign*

that they've got interest in learning for the sake of learning. So what courses might they have taken to expand themselves on the horizon? Have they done any kind of research work and done any kind of publication work? That, I think, is certainly a positive." In fact according to a program director, *"You can almost not get into (name of program) any more unless you have previous research experience."* Thus some students with lower grades were still selected if they could provide other evidence, such as research/publications, that were of equivalent "weight." Achievement in other areas e.g. Ph.D or Master's level courses, teaching, extra-curricular activities, leadership, volunteer work, evidence of perseverance (multiple applications, *"jump through the hoops"*, *"paid his dues"*) etc. were viewed positively. There was a strong preference for at least one year of private practice or a General Practice Residency experience; more years of experience were often preferable. In addition candidates required pleasant personalities and ability to fit in a team environment. Thus successful candidates needed to have, besides academic accomplishments, in the words of a program director, *"a lot of outside activities and outside creative interests or accomplishments."*

At the same time, candidates assessed the programs. Candidates who received multiple admission offers were able to select programs based on these assessments. A student stated, *"I visited _____ with Dr. _____ ... I came back, and I knew I wasn't going to apply there. So that did me a lot of good ... First, I don't like the city. But when I was there, he was actually extremely nice to me, and I kept asking him, "Well, what should I do to strengthen my application?" "Research"; every other word out of his mouth was "research." Research is nice and dandy. I'm not going to graduate to be a researcher ... So I came back and I told my wife, "Well, at least I know I'm not applying to _____."*

Stage II: Weighing options: After the interview, selection committees met to create the framework of acceptability for that year, establish ranking, and determine outcomes.

(D) Creating the framework of acceptability: Selection committee members debated their perceptions following the interview. One director gave an example, "*Sometimes in*

the committee one person said, "Well, I think this student is very, very keen on research," and somebody else will say, "No, I think he was just trying to fool you." ...We'd have long debates." In this phase, the framework that would be used to select students was made explicit. Perceived dishonesty resulted in rejection, as did arrogance or inability to fit into a team environment.

(E) Establishing ranking: During ranking, prospective students were each reviewed in relation to the framework of acceptability. Using a democratic process, ranks were established by adding up scores awarded to candidates by each selection committee member or simply by voting. A program director described how ranks were established, *"majority rules; nobody's decision is weighted any more than anybody else. So what we basically do, we all would list our candidates in the order in which we want to see them selected, and then we add the numbers together. I mean, if you're number one on three lists, that would be three; number two on a couple of lists, that'd be, two and two is four; so that'd be a total score of seven. And that's the way we rate them, and then we pick those with the lowest numbers. The lowest number would be number one."* Another director agreed, *"at the end of the day it becomes an arithmetic process."*

(F) Determining outcomes: This phase provided a final opportunity to finalize the framework of acceptability and rank all applicants using it. Some programs invited students to review the ranks and raise concerns if any.

Stage III: Concluding decisions:

During the third stage of the admissions process, committees made their final decision in two phases.

(G) Communicating results: Applicants were assigned to one of three categories: successful, wait-listed, or unsuccessful. Successful candidates were required to confirm their acceptance within a specified time period. Those selected by more than one institution had to choose their preferred program. One director explained how the

programs collaborated, *"All the Canadian programs work together, and we notify the candidates on the same day that they would be accepted and then they're all given the same amount of time to make a decision whether they want to accept our program or not. And also the Canadian programs have an arrangement amongst ourselves so if somebody accepts a position at the U. of __, I immediately contact the other programs, and they delete that person off their list. And that stops people from accepting one position and then changing their mind and going somewhere else. Once they've accepted one position, they're no longer considered in another program in Canada. Then when those students have made up their mind, if they choose (our university), then we're done; if they choose somewhere else, then we go on to our alternates in rank order. And each one then gets offered a position, and then each one of them just gets given a day or two to make a decision after the first time."*

(H) Planning for the future: During the last phase of this stage, program directors spent time counseling unsuccessful applicants, if requested. One of them stated, *"I encourage them to come in and sit down with me and go over how they, number one, might improve their transcript, what they can do to perhaps look more positive, or how they could have perhaps done better in the interview process."* However another regretted, *"in this litigious society I don't think you can tell them specific things because next year they'll expect to get in if they, "Well, I did this and this and this," therefore I should get in ... So the feedback we give is general feedback."*

Candidates who applied again with significant improvements were perceived very positively, as explained by a director, *"we've had a guy that we accepted recently that, I think, applied for four years before the person got in. And I mean, what he went and did is some additional graduate study; he did additional research, submitted publications, went to orthodontic conferences. Really walked the extra mile to get in, and that perseverance is something that we like to notice as well—somebody who perseveres and continues to persevere and continues to try and improve the deficiencies. And this is a person with a mediocre GPA who had to go and do additional things and eventually got in just because, I think, that perseverance is something that we're looking for as well."*

3.6 INTERNATIONAL APPLICANTS

Some program directors welcomed applications from international students. Proficiency in English or French must be demonstrated. TOEFL scores for English programs were required. Ability to communicate was also assessed during interviews.

Other program directors regretted their inability to evaluate international applicants. They recommended that such candidates obtain U.S. / Canadian dental or post graduate experience in order to prove their abilities in a North American environment.

3.7 OBJECTIVITY

All participants agreed that the selection process was subjective. Some believed this was necessary since they were, *"measuring things there's no measure for."* A program director declared, *"The process is objective in its subjectivity ... I don't think a thing like this can ever be totally objective; otherwise you might as well just get them to enter stuff in a computer and let the computer rank them and then say which students we have to accept which will be the easiest way. But that's not the way we want it; this is not necessarily a numbers game."* However others hoped to see more objectivity in the future. One program director wished for a tool that would allow a more objective selection. While some schools already ask the same core questions of all participants and then add supplementary questions as needed, a faculty member proposed a structured interview format with specific grades awarded to each answer. However, several directors (not all) were satisfied and reluctant to see change in the selection process since, *"it works."*

3.8 STANDARDIZATION

One program director summarized the feelings of his colleagues when he stated, *"I don't think there's any need for standardization. I think you should recruit the kind of student that you want for your program ... different programs have different goals."*

Several other participants voiced the same opinion. However, some faculty members and students (a minority) called for greater standardization across Canadian programs and among the selection committee members in each program. They stated a preference for greater uniformity in the application forms, CV's, implementation of pre-application visits, social evenings and lunches, more structured interview processes, objective grading, increased students participation, and greater power sharing by program directors in selection outcomes.

3.9 INTEGRATION WITH THE LITERATURE

Orthodontic selection committees spend considerable time and effort reviewing applications/references in order to short list candidates for interview, following which they are rank ordered. Dental, medical and other literature show extreme and conflicting view points on the whole process. In fact, Boyse (2001) found that none of the elements from medical students' applications predicted performance during radiology residency. Adusumilli (2000) found no correlation between radiology residency applicant selection rank and subsequent performance ($P<.05$). Borowitz (2000) too found that, while individuals ranked in the top 10 of the match list performed better than their peers, for all other pediatric house officers there was no association between match ranking and subsequent performance. However several (not all) Canadian Orthodontic directors thought the selection process used by their program was sound, since it yielded excellent students, and did not support the adoption of a standard, Canada-wide selection process.

APPLICATION: RANK AND GRADES

Academic performance was the first criterion examined when short listing Canadian orthodontic applicants for interview. Class rank was considered more important than grades since it compensated for variation between schools. Similar findings were reported by Spina et al. (2000) in oral and maxillofacial surgery resident selection, Grantham (1993) in radiology selection, Baker (1993) in computer assisted resident candidate selection, Crane (2000) in emergency medicine (EM) programs, and Bernstein

et al. (2002-2003) in orthopedic residency selection. However, other medical specialties gave less importance to class rank and grades e.g. physical medicine & rehabilitation (PM&R) as reported by DeLisa (1994) and Pediatric emergency medicine (PEM) by Poirier (2003). Rinchuse and Rinchuse (2004) have questioned policies of graduate orthodontic programs that restrict admission to those with the highest dental class ranks/grades and national board scores.

There is some research correlating academic performance with future residency performance. Harris et al. (1976) thirty years ago found that performance in the Michigan graduate orthodontic program correlated poorly with undergraduate class standing. Undergraduate orthodontics courses made no significant contribution to this prediction. Borowitz (2000) found that medical school grades and performance on standardized examinations were not predictors of clinical performance of pediatric house officers. Boyse (2001) found that medical school performance in preclinical courses, some clinical courses and the USMLE predicted success on the American Board of Radiology examination, but not radiology rotation performance. In fact none of the elements from medical students' applications predict performance during the residency. Bell (2002) similarly noted a positive correlation between the USMLE scores for obstetrics and gynecology residents and their subsequent performance on in-training examinations implying that standardized cognitive function tests taken by medical students may be predictive of similar tests during residency. However no correlation was found with medical school achievements (USMLE scores, clinical rotation honors grades, and interview scores) and clinical abilities. Carmichael (2005) likewise found a cognitive test correlation in orthopedics residents; those with scores above 220 in the USMLE fared better in the Orthopedic In-Training Examination.

However other studies have found a positive correlation between academic performance and future residency performance. Handelman et al. (1983) found that of all proposed predictors of performance, the highest correlation was with academic achievement ($r = 0.347$, $p \leq 0.05$) in postdoctoral dental students at the Eastman Dental Center advanced general dentistry training program. Calhoun (1997) found that highly satisfactory otolaryngology residency performance could be reasonably predicted by

excellent academic performance in medical school. Andriole (2004) found significant associations between postgraduate year 1 (PGY-1) performance of surgical graduates and each of third year clinical clerkship grade point average and USMLE step 2 score. In a multiple linear model the latter was the only significant predictor of PGY-1 performance. Hayden (2005) noted that USMLE percentile was a predictor of emergency medicine residents overall performance.

It is therefore clear that cognitive function tests may be predictive of similar tests during residency. Associations with clinical performance are less clear. A program director defended his emphasis on dental school grades since they include an assessment of clinical skills. His approach is somewhat justified by Dirschl et als. (2002) findings that the number of honors grades on clinical rotations were the strongest predictor of orthopedic residents' performance ($p < 0.05$).

APPLICATION: RESEARCH EXPERIENCE AND INTEREST

This study was the first to discuss consideration of other evidence when grades/ranks were not as high as one might prefer. Canadian programs place great emphasis on research interest and experience. Pre-existing research qualifications are highly valued. This may be related to the fact that all programs are university based, have a master's component, and are headed by academics. The current shortage of the latter necessitates selection of candidates who may embrace a research-oriented career path. Other medical specialties may not have such requirements.

DeLisa (1994) found that the least important criterion used by physical medicine & rehabilitation (PM&R) program directors to rank candidates was research interest. The least important academic criteria in selecting residents were research ability, and pre-existing research qualifications (PhD, Masters degree). Crane (2000) found that emergency medicine (EM) program directors, placed very low emphasis on publications (2.87 ± 0.99). However, Poirier (2003) showed that Pediatric emergency medicine (PEM)

subspecialty program directors placed the highest importance on research potential, second only to recommendations.

APPLICATION: EXPERIENCE

Canadian programs prefer at least a year of GPR or private practice experience; more years are often preferable. This is a good strategy considering the findings of Harris et al. (1976) that Michigan graduates who had practiced for at least a year prior to returning for graduate orthodontic study performed better than those who had immediately entered that program right out of dental school.

APPLICATION: INTERNATIONALS

While some Canadian programs welcomed international candidates, others regretted their inability to evaluate them. The latter recommended that internationals complete some form of dental or post-graduate training in North America to allow performance evaluation in a North American context. Interviews were important to judge language skills. The following study gives credence to such attitudes. Gayed (1991) surveyed internal medicine residencies to assess criteria used to select foreign born medical graduates that predicted performance. Performance in the interview and post graduate clinical experience in the U.S. were amongst the most important predictors. Seventy three percent of directors relied on reference letters from the U.S. believing that those from foreign countries were difficult to evaluate.

APPLICATION: LETTER OF INTENT

Orthodontic selection committees placed varying degrees of importance on the letter of intent. Crane's (2000) survey of emergency medicine (EM) program directors showed they placed the least emphasis on personal statements.

REFERENCES

While some orthodontic program directors put great emphasis on reference letters, others barely read them. This is consistent with other graduate medical programs. Poirier (2003) found that Pediatric emergency medicine (PEM) program directors felt that the most important factor in short listing candidates for interview were recommendation letters from PEM colleagues. Baker (1993) analyzed CARCS (computer assisted resident candidate selection) files and found that quality of references were the most important component in the pre-interview performance during selection of residents (all applicants had high grades). DeLisa (1994) found that letters of recommendation were the second most important criteria used by physical medicine & rehabilitation (PM&R) directors to rank candidates. Crane's (2000) survey found that recommendations (4.11 ± 0.85) were the fourth most important selection criteria for emergency medicine (EM) programs. However, Grantham (1993) showed that barely half of the radiology program directors surveyed considered letters of recommendation to be an important selection criterion.

Orthodontic selection committees preferred reference letters from academics. For oral and maxillofacial surgery resident selection, Spina et al. (2000) found that letters of recommendation were considered more valuable when written by a department chairman and program director. DeLisa's (1994) survey showed that the most important letters of recommendation were from a clinical physical medicine & rehabilitation (PM&R) faculty member in the respondent's department, followed by the chairperson of a PM&R department, and the Deans letter. Poirier (2003) found that Pediatric emergency medicine (PEM) program directors felt that letters from PEM division chiefs and clinical faculty were most important.

Literature exploring correlation between references and subsequent performance in residency was perused. Boyse (2001) found that outstanding dean's letters and letters of recommendation did not predict high examination scores or performance in radiology residency. Dirschl et al. (2002) showed that letters of recommendation had a poor correlation with all outcome variables ($p > 0.5$) for orthopedic residents. Handelman et al. (1983) found weak, though statistically significant, correlations for the letters of

recommendation ($r = 0.192$, $p \leq 0.05$) in postdoctoral dental students in the Eastman Dental Center advanced general dentistry training program. However, Hayden (2005) showed that ratings on the dean's letter/other recommendation letters were a predictor of success in emergency medicine residents.

SOCIAL EVENING

Some orthodontic programs hosted a social evening for candidates in order to judge them but also convey warmth and friendliness in order to attract applicants who had the privilege of being able to choose between programs. Marciani et al. (2003) found that oral and maxillofacial surgery residencies that conveyed a friendly atmosphere, that had residents who possessed favorable interpersonal skills, and that had faculty with appealing personalities were the most attractive to candidates.

FORMAL INTERVIEW

Orthodontic selection committees disregarded academic performance and focused on personality characteristics at the interview. Honesty, ability to fit into a team environment, and "confident humility" were particularly important. Spina et al. (2000) found the highest rated characteristics during the oral and maxillofacial surgery resident selection interview included being energetic, confident, and honest. DeLisa (1994) showed that during the interview the three most important characteristics considered by physical medicine & rehabilitation (PM&R) program directors were compatibility with the program, ability to articulate thoughts, and ability to work with the team. Bernstein et al. (2002-2003) noted that formality/politeness at interview, and personal appearances of the candidate were among the most important criteria for orthopedics program directors. DeGroot (1999) used videotaped interviews with 110 managers and found that a composite of vocal cues (speech rate, pauses, pitch, pitch variability and amplitude variability) correlated with judgments made by interviewers ($r=0.20$, $p<.05$). In addition visual cues (smiling, physical attractiveness, gaze, body orientation, hand movement) also correlated ($r=0.21$, $p<.05$) with performance. Factors such as liking, trust, and

attributed credibility play a role in judgments made at interview.

A program director lamented that at the interview, *"it's like you can almost hear somebody else talking —they've gone and talked to somebody about what the people are looking for in interviews and it almost sounds like they've prepared all of their answers that they're expecting the questions to be in advance. And so it comes off as rather contrived."* However, there is research justifying the actions of candidates who prepare for interviews. Maurer (1998) conducted a study on 213 applicants for promotion in police and fire departments in a large U.S. city. Coaching attendance and preparation had a positive association with interview performance. Strategies such as role-playing and study group participation also improved performance.

A director admitted that, *"professors like to pick disciples who are more like themselves."* Anderson (1990) had thirty eight graduate interviewers assess 330 interviewees. Applicants with similar backgrounds, attitudes and perceived personalities were preferred by interviewers. There was a correlation between evaluations of r=0.5 with perceived similarity, and r=0.64 with personal liking, showing how susceptible interviewers were to such biases. A "clone syndrome" was apparent where interviewers were recruiting in their own image.

Interview committee members usually had access to a candidates' application and other information. This may not be the best strategy based on the following studies. Smilen (2001) correlated interview and USMLE (United States Medical Licensing Examination) scores over two years. In the first year interviewers were provided applicants USMLE scores, whereas in year 2 they were not. He found a significant correlation between year 1 interview and board scores (correlation coefficient 0.64), and a negative correlation in year 2 (correlation coefficient -0.06). He concluded that markers of academic achievement e.g. USMLE scores may create a bias and therefore interviewers should be blinded to board scores and possibly other data such as transcript grades to ensure the interview remains an independent means of evaluation. Miles (2001) studied 132 surgical residents who underwent two separate interviews, one by committee

members informed only of the applicant's name and medical school, and a second where interviewers had prior knowledge of the complete application. He found that the assessment of candidates may be significantly influenced by data provided to interviewers prior to the interview. The non-medical/dental literature showed similar conclusions. Macan (1990) obtained participation from one hundred and twenty recruiters who provided data on 235 interviews in a college placement setting. The study explored the relationship of pre-interview impressions of candidates to post-interview impressions and success in recruitment. He found that recruiters' post-interview impressions of the candidates' qualifications were significantly related to their pre-interview impression ($r=0.53$, $p<.01$).

Orthodontic interview committee members often selected and pre-assigned questions they wish to ask all candidates; however, a participant suggested that interviews be conducted using a more structured format. Structured interviews have been shown to be advantageous. Patrick (2001) evaluated two residency admission interviews by each of 490 applicants using a structured format. He found moderate to low correlations with other admission criteria e.g. cumulative GPA and MCAT, suggesting that information obtained at interview was unavailable from other sources. Thus they should be used in addition to other selection measures. Agreement between interviewers' overall score was good suggesting that structured interviews would be a valuable selection tool. Bandiera (2004) attempted to determine intra-rater, inter-rater, and overall reliabilities of a structured interview format with structured scoring procedure used on 16 emergency medicine applicants who were interviewed by four pairs of interviewers. Overall interview scores had very high reliability (0.83). Each interviewers scores had high intra-class correlations (mean 0.85), but within interview teams inter-rater correlations were moderate and not higher than across interview teams (0.36, 0.59, 0.69, 0.49). He thus concluded that highly reliable overall interview scores could be achieved if scoring instruments were well designed and interview protocol was strictly adhered. Conway (1995) conducted a meta-analysis of 49 coefficient alphas and 111 inter-rater reliability coefficients from selection interviews. For highly structured interviews he

estimated upper limits of validity to be 0.67, and for unstructured interviews 0.34. Increasing standardization improved inter-rater reliability and construct validity.

Unstructured interview formats too have their place. Blackman (2002) evaluated structured and unstructured interviews on 102 undergraduate students at a 4-year university. She found that unstructured interviews produced significantly more accurate judgments about the candidates job-related personality attributes. Such interviews allowed applicants to talk for significantly greater periods than in structured formats. The author therefore recommends initial screening using a structured interview to gain insight into the applicants' job related skills. This may be followed by an unstructured interview on short listed candidates to explore work related personality traits.

While some Canadian program directors laid great stress on the selection interview, others discounted their value. Baker (1993) analyzed CARCS (computer assisted resident candidate selection) files and found that the interview was the second most important factor determining selection outcome (all applicants had high grades). Crane's (2000) survey of emergency medicine (EM) program directors showed a similar finding.

The importance of the selection interview is not fully established in the literature. Smith (1991) compared the academic and clinical performance of students in medical school and residency admitted with and without an admission interview. He found that the performance of the two groups were not significantly different, calling into question the validity and reliability of selection interviews. Borowitz (2000) found that interviews were not predictors of clinical performance of pediatric house officers. Metro (2005) correlated scores that anesthesiology applicants receive after interview with subsequent evaluation during training at the University of Pittsburgh. The author was unable to find a statistically significant correlation between selection committee scores and any area evaluated throughout residency, other than the first year in training examination ($p<.05$). Handelman et al. (1983) found a weak, though statistically significant, correlation for the personal interview ($r = 0.206$, $p \leq 0.05$) with subsequent performance of postdoctoral

dental students in the Eastman Dental Center advanced general dentistry training program.

INQUIRING AND ANALYTICAL MINDS

Canadian programs prefer candidates with inquiring and analytical minds. Poirier (2003) demonstrated that ability to grow in knowledge and solve problems was an important consideration in the final ranking of Pediatric emergency medicine (PEM) applicants.

SELF DIRECTED AND HARD WORKING

Canadian orthodontic programs want individuals who can work hard. Poirier (2003) found that commitment to hard work was an important factor in the final ranking of Pediatric emergency medicine applicant.

EXTRA-CURRICULAR ACTIVITIES

Extracurricular activities and achievements are viewed favorably since Canadian programs want "well rounded" individuals. Hayden (2005) noted that distinctive factors (championship athlete, officer in medical school) were an important predictor of success in emergency medicine residents.

POST-INTERVIEW DISCUSSION AND RANKING

Canadian orthodontic selection committees act in a democratic manner when making their final selection with directors working together with other committee members. Some committees have a student representative; others allow students a minor role, allowing them to voice concerns, while a minority disallows student participation. Spina et al. (2000) found that in 88.7% of oral and maxillofacial programs a committee completed the decision process, whereas in the remaining 11.3% it was completed by the

program director or chairman. House staff participated in the decision process in 94.4% of the programs.

IMPROVEMENTS

While several participants in this study were very satisfied with the orthodontic selection process others saw need for positive change. Most participants including students who had applied several times made relatively minor suggestions for improvements. Spina et al. (2000) also found that most oral and maxillofacial surgery programs (89.9%) indicated satisfaction with their current selection process.

3.10 IMPLICATIONS

While several participants expressed satisfaction with the orthodontic selection process, others hoped to see positive change.

3.10.1 Programs

Programs that have not done so may wish to establish and publicly state their core values and mission statements in tandem with those from their parent universities. They may also consider exploring the extent to which their responsibility goes beyond their department to include university and society at large. From this perspective, the goal of the department would be to select orthodontic students that would serve the needs of their university and the community.

There was some concern expressed regarding a perceived over-supply of practitioners. In fact one program director admitted, *"I think the big cities are getting to the point of being pretty much saturated ..... certainly the income of the existing pool is going to decrease."* Programs, in consultation with the orthodontic community, while focusing on recruiting applicants with research/academic interest, may wish to reconsider

overall levels of enrolment, as well as the need to start new graduate programs in the future.

Some participants wished to see more fairness and objectivity in the process and raised the possibility of using commercially available personality and integrity tests. Group-based situational testing may also be used during the interview process.

A minority spoke of a need for greater uniformity in application forms, implementation of pre-application visits, social evenings and lunches, more structured interview processes, objective grading, increased student participation, greater power sharing by program directors in selection outcomes, regular assessments of the selection process, encouragement of feedback, greater openness to change and strict policies to counteract religious/ethnic/sex/age bias. However these categories were not saturated.

3.10.2 Students

Applicants may wish to use the findings of this study to learn more about *"the ideal candidate."* Increased awareness of selection factors may facilitate analysis of strengths and weaknesses when considering application to orthodontic programs. This study may help dispel unfounded myths regarding the selection process. Applicants may also benefit from a more level playing field compared to those with "inside" knowledge of program requirements and preferences.

International applicants may benefit from the knowledge that their applications are welcomed by some programs, but that North American academic experience prior to application is preferred by others.

3.10.3 Research

Further research to establish valid student performance measures and predictors of success as an orthodontist are needed. This could be done by conducting an ethnographic study to explore the beliefs and values that define a successful orthodontist in clinical practice and academia.

Studies investigating attitudes of unsuccessful applicants would add more to an understanding of the selection process. A second ethnographic study could be carried out comparing the experience of accepted and rejected applicants to explore the features associated with rejection.

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